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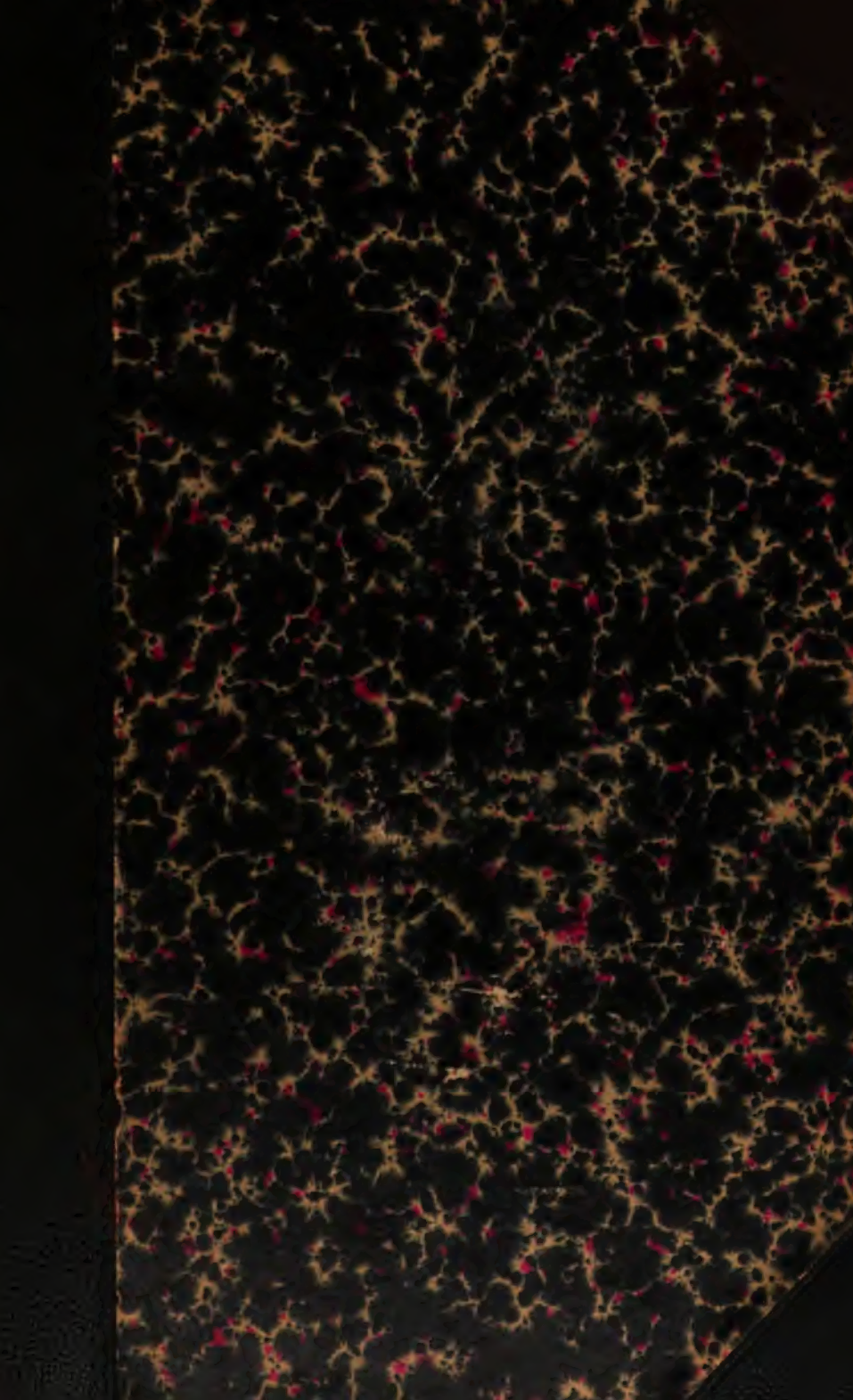
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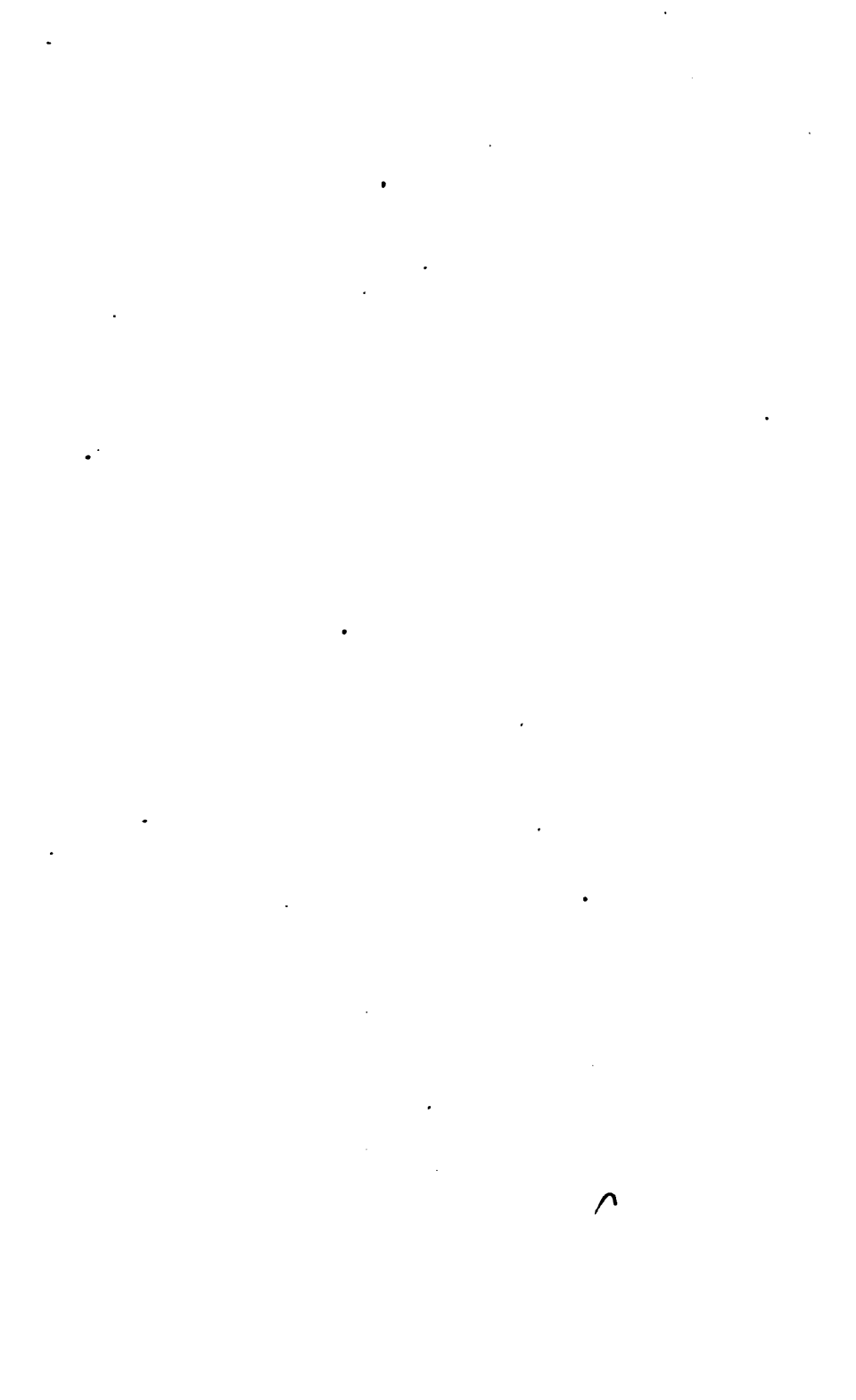
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For the purpose of this study, the following hypotheses were formulated:

1. $\mathcal{H}^1(\mathbb{R}^n) \subset \mathcal{H}^2(\mathbb{R}^n)$ and $\mathcal{H}^2(\mathbb{R}^n) \subset \mathcal{H}^1(\mathbb{R}^n)$ if and only if $n = 1$.
 2. $\mathcal{H}^1(\mathbb{R}^n) \subset \mathcal{H}^2(\mathbb{R}^n)$ and $\mathcal{H}^2(\mathbb{R}^n) \subset \mathcal{H}^1(\mathbb{R}^n)$ if and only if $n = 1$.

Robert E. and I
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$$U^{\text{eff}} = U_0(\text{Gib}) + \mu_0 \left(\frac{1}{2} \left(\frac{1}{\epsilon_0} - \frac{1}{\epsilon} \right) \left(\frac{1}{2} \left(\frac{1}{\epsilon_0} - \frac{1}{\epsilon} \right) \right) \right) + \frac{1}{2} \left(\frac{1}{\epsilon_0} - \frac{1}{\epsilon} \right) \left(\frac{1}{2} \left(\frac{1}{\epsilon_0} - \frac{1}{\epsilon} \right) \right)$$

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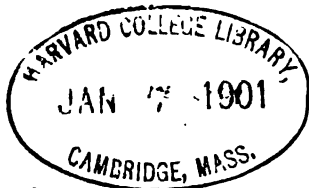
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THE ROYAL IRISH ACADEMY.

PAPERS READ BEFORE THE ACADEMY.

I.

ON THE FIRST MITOSIS OF THE SPORE-MOTHER-CELLS
OF LILIUM. BY HENRY H. DIXON, Sc.D., Assistant to
the Professor of Botany, Dublin University.

[PLATES I. AND II.]

(COMMUNICATED BY DR. E. P. WRIGHT.)

[Read DECEMBER 11, 1899.]

WITHIN recent years so much has been written on the nuclear divisions taking place in the spore-mother-cells of the higher plants, and so apparently divergent are the views, both as regards the general process and the details of its history, that it might at first appear from a survey of the literature that little had been definitely ascertained. By a closer study of the recent memoirs on the subject such an opinion will be dispelled. From these it will appear that there are at least several stages in the process which are admitted, and which have been constantly observed by the various investigators who have made this subject their study. Wide differences of opinion, doubtless, exist; but these are principally with regard to the processes by which these well-established stages are derived from one another. Such variance of opinion must be expected, seeing that the events cannot be continuously observed from start to finish, and that such complicated processes carried out on so minute a scale can often be only indirectly inferred from an interrupted sequence of arrested stages.

The stages of the process of mitosis in the spore-mother-cells, acknowledged by all observers, may be briefly summarized as follows:—

(1.) The “*dolichonema*” stage, fig. 1.—The large nucleus of the spore-mother-cells is occupied by an enormously long and attenuate thread, consisting of a single series of chromatin granules (the *chromomeres*) imbedded in the *linin* matrix. This thread presents few or no anastomoses.

(2.) In the next stage (fig. 2) the nucleus is in what I would suggest to call the “*strepsinema*” condition. The chromatin appears in much the same condition as in the preceding stage, except that in many places it may be seen that two portions of the thread are more or less loosely twisted together. The later this stage is observed, the thicker the chromatin thread appears, and the greater the amount of the thread so twisted.

(3.) The thick twisted chromatin thread appears broken into a number of chromosomes, which have the form of twisted loops or two short threads twisted together, with four free ends, or of rings (figs. 3 and 4). The number of these chromosomes is half that found in the nuclei of vegetative cells. In the later periods of this stage the chromosomes are thicker than at the beginning, and the separate *chromomeres* in the threads are no longer visible.

During these first three stages the nuclear membrane remains intact, and one or more nucleoli of large but gradually waning dimensions are present in the nuclear fluid.

(4.) Nuclear plate (figs. 5 and 6).—The thickened chromosomes, composed of two portions twisted together, lie radially disposed in the equatorial plane of the nucleus, and attached by their internal extremities to the fibres of the achromatic spindle. The nuclear membrane and large nucleoli have disappeared.

(5.) Metaphase (fig. 7).—Two thin V-shaped daughter chromosomes occupy the place of each of the thick twisted chromosomes in the equatorial plane. They are so disposed that the apices of the Vs point towards the poles of nucleus, while the two free ends of one are in contact with the ends of its fellow in the equatorial plane.

(6.) Anaphase (fig. 8).—The daughter chromosomes lie round the poles; they are still V-shaped, but the limbs of each V have become

more or less parallel, and the chromomeres in them again become visible.

With these well ascertained stages before us it will be more easy to discuss the connecting processes, entering the debateable ground from these firmly established facts.

How the resting nucleus of the mother-cell of spores passes into the dolichonema condition does not appear to have been very precisely studied. It appears to be generally accepted that the irregular anastomoses of the nuclear net-work disappear, and the chromatin granules arrange themselves along the lengthening thread in series, while, concomitantly, the nucleus greatly increases in size.¹

The stage described as "synapsis" intervenes between stages 1 and 2, *e.g.* between the dolichonema and strepsinema stages. Some authors² believe that the balling together of the chromatin thread observed in this stage is artefact, while Miss Sargent³ has observed it in the living cells of *Lilium*. Synaptic nuclei are often found in very carefully fixed material (both by Flemming's solution and alcohol) and in close proximity to nuclei in the dolichonema stage.

Apart from the question of the natural occurrence of synapsis a difference of opinion exists as to how the strepsinema stage arises, and is to be derived from the dolichonema stage.

The great majority of observers describe a longitudinal division of the chromatin thread during the end of the dolichonema stage. According to these writers the chromomeres in the thread divide first, and then the linin carrying them separates into two parallel filaments; these filaments then twist round each other, and diverging at places give rise to the strepsinema condition.

A careful study of the process, however, in the pollen-mother-cells and embryo-sac of *Lilium longiflorum* led me⁴ to regard the strepsinema condition as more probably arising from the looping on each other and approximation of two portions of the dolichonematous thread. As the actual transition from one stage to the other cannot be observed, we can only indirectly infer the nature of the process from the appearances of the successive stages presented in fixed specimens. The

¹ Guignard: "Le Developpement du Pollen," Arch. d'Anat. Micr., mars. 1899.

² Guignard, *loc. cit.*, Schaffner: "The Division of the Macrospore Nucleus," Bot. Gazette, 1897.

³ Ann. of Bot., Sept., 1896.

⁴ Dixon: "On the Chromosomes of *Lilium longiflorum*," Proc. Roy. Irish Acad., 1896.

appearances which led me to adopt this view of the process are briefly, the following :—

(1.) The frequent loops on the double twisted thread (figs. 2 and 10) could scarcely be found if the two twisted portions arose by the longitudinal fission of a single thread. The assumption of the fission origin would involve the assumption of a premature transverse fission also accompanied by the fusion of some of the adjacent ends of the partial threads. Such a transverse fission in this stage has not so far been recorded.

(2.) The twisted portions of the thread are not in close proximity to one another throughout the whole course of the double thread, but wide divergences are of frequent occurrence, forming secondary loops (figs. 2 and 9). If the adjacent portions arose by longitudinal fission the divergences would necessitate a longitudinal displacement of the portions past each other throughout the thread. Such a sliding of the viscid portions of the chromatin thread past each other seems highly improbable. Divergences of this nature, involving more or less longitudinal displacement (if longitudinal fission is assumed), are also figured by Miss Sargent¹ and Schaffner.²

(3.) The thread of nuclei, which are in a transitional stage between the dolichonema and the strepsinema condition, in places appears double and twisted and in places single. Where it is double, the diameter of each of the portions is apparently equal to the diameter of the single thread. If the two portions of the double thread were really derived by the fission of the single thread, it is evident that the single portion should be nearly double as thick as each of the two twisted portions. The actual proportion of the single to the double thread is shown in fig. 2, and also by Schaffner.³

(4.) If the twisted portions of the strepsinematous thread had arisen by fission, the chromomeres of the adjacent portions should correspond, since the opposite chromomeres of these threads have arisen, by hypothesis, from single chromomeres of the original thread. Frequently, however, this is not the case, as observation will show (fig. 9), and as, indeed, the careful drawings of Schaffner⁴ and Gregoire⁵ demonstrate. The non-correspondence of the chromomeres in the twisted portions is what would be expected if these portions

¹ Ann. of Botany, Sept., 1896, and June, 1897. ² Bot. Gaz., June, 1897, fig. 10.

³ Schaffner, Bot. Gaz., June, 1897: fig. 10a.

⁴ Schaffner, *loc. cit.*, figs. 8b and 8c.

⁵ La Cellule, t. xvi., 2^e fasc., fig. 2.

were brought together from different regions of the dolichnematous thread.

(5.) Immediately after the nucleus enters on the strepsinematous stage, the coils of its thread appear less intricate; if the twisted portions were formed by the longitudinal fission of the dolichnematous thread no such diminution of complexity, but rather the reverse, should appear, while the approximation of distant parts of the thread and their coiling round one another would leave the nuclear cavity less encumbered, and bring about the less intricate appearance. A comparison of fig. 1 with fig. 2, and also of Schaffner's fig. 10 with fig. 8,¹ will exemplify this point.

(6.) Finally, intermediate stages between the dolichonema and the strepsinema stages often present themselves which appear to connect these two stages without the intervention of any longitudinal fission (fig. 10). In these stages the approximating portions are still more distant from one another than they are in the strepsinema condition, but still an indication of the looping and twisting of the thread can be made out.

These considerations still incline me to the belief that the strepsinema condition is brought about by the twisting of the originally simple thread upon itself. But I believe it is quite possible, and even probable, that each of the two twisted portions undergoes a longitudinal fission while still in the strepsinema stage or immediately after the differentiation of the chromosomes. This fission has been figured by Schaffner,² Guignard³ and Gregoire.⁴ The last two authors, however, regard this as the second longitudinal fission, while the first agrees with the point of view urged by me, regarding it as the only longitudinal fission. Schaffner, however, curiously enough also believes that the strepsinema condition arises by this fission. I have myself frequently observed appearances, both while the thread was intact and immediately after it had broken into separate chromosomes, which might be interpreted in this manner. But considering that such appearances might be produced by interference phenomena⁵ round the sides of such minute bodies as the chromomeres, one cannot be positive that they have an objective reality in the longitudinal cleavage of the chromomeres.

¹ *Loc. cit.*

² *Loc. cit.*, fig 11b.

³ Guignard; Le dev. du pollen dans le *Najas major*. Arch d'anat mic. 20 mars. 1899.

⁴ *Loc. cit.*, fig. 10.

⁵ The Microscope. Naegeli and Schwendener. Eng. Trans. p. 238.

The strepsinema condition having arisen as we have seen from the twisting together of the dolichonematous thread, the nucleus enters on the next stage in which the double thread is broken into a number of chromosomes, each composed of two portions twisted and looped together, as is shown in figs. 3 and 4. The chromosomes are of very different lengths; in some the component chromatin threads take two or more complete turns round one another, in others a quarter revolution is all that each short thread takes round its neighbour (fig. 4). Towards the end of this stage the chromosomes are short and bulky, and the direction of the twist of the component parts is easily studied. It is remarkable that in the same nucleus the twist is not always in the same direction, but we may find a chromosome with a right-handed twist lying side by side one with a left-handed twist. While the chromosomes are becoming shorter changes are noticeable in them; the chromomeres lose their individuality, and all merge in the densely staining chromosome, the twisting in each chromosome is reduced to one complete turn or less, and all signs of the longitudinal split, real or apparent, in the components portions disappear. Little or no diminution in distinctness of the two twisted portions is observed.

With regard to the nuclear plate stage, some discussion¹ has been raised as to whether the two portions of the chromosomes lie in the equatorial or in meridional planes; as a matter of fact careful observation shows that in the same nuclear plate the peripheral ends of different chromosomes lie indifferently in either of these planes or in planes inclined to them. The fact that the portions are twisted on each other makes it impossible to assert that the portions themselves lie in any one plane.

I formerly believed that of the looped chromosomes the closed end was regularly directed towards the axis of the cell and the free ends directed towards the periphery.² Having found several undoubted instances of the looped end being directed outwards, I am compelled to consider that it is a matter of accident in which direction in the nuclear plate the chromosomes lie. The same nuclear plate actually sometimes shows chromosomes in the two positions (fig. 5).

The manner of attachment of the chromosomes to the fibres of the achromatic spindle, and the method of formation of the two V-shaped daughter chromosomes from the thick twisted chromosomes of the equatorial plate are matters of dispute. Several authors believe that

¹ Gregoiré, *loc. cit.*

² Dixon, *loc. cit.*; Schaffner, *loc. cit.*

the two portions of the twisted chromosomes separate, and each by itself forms a single V-shaped chromosome for the new nucleus. Two different methods for this formation have been urged. Farmer¹ believed that each twisted chromosome bends on itself about the middle, and at the point of bending becomes attached to the fibres of the spindle. The fibres from one pole form connections with one of the portions, those from the other pole with the other portion of the chromosome. In this way each V-shaped daughter chromosome really represents one complete and intact portion of the twisted chromosome bent upon itself. In this view Farmer is followed by Miss Sargent² and Mottier.³ Undoubtedly such a bending, as Farmer describes, may occasionally be seen, but I venture to think that it is far from being the general rule. As Gregoire⁴ suggests, it seems to have become regarded as the normal form in order to explain the general occurrence of V-shaped daughter chromosomes arising from the division of the equatorial plate; but as Gregoire also has pointed out, these bent chromosomes in reality give rise to 4 V-shaped daughter chromosomes, while the much more general unbent form gives rise to the normal two V-shaped chromosomes.

Although Gregoire in this respect differs from Farmer, he agrees with the latter in regarding the division which takes place in the equatorial plate as separating the two portions of the twisted chromosomes and distributing them to the daughter nuclei. He believes that as they separate from one another they undergo a longitudinal fission, and as they part from the equator the ends of these cleavage segments nearest the equator diverge, and so the V-shaped chromosomes are formed.

This explanation, however, does not, I think, take into account the manner in which the V-shaped daughter chromosomes actually part asunder from one another in the equatorial plate. If Gregoire's scheme were accurate, it would seem that at the moment of separation the two daughter chromosomes would often be laterally displaced one over the other so as not to lie on the same meridian of the cell; both limbs of the upper V should lie to the left of those of the under, or *vice versa*. This would appear to be the natural result from the formation of the two limbs of each V-shaped daughter chromosome from one twisted portion of the chromosome of the equatorial plate. Gregoire⁴ himself

¹ Farmer and Moore. *Anat. Anzeiger.* Aug. 1895.

² Miss Sargent, *Ann. of Bot.* Sept., 1896. ³ Mottier *Jahrb. f. wiss. Bot.* 1897.

⁴ Gregoire, *loc. cit.*

⁵ *Loc. cit.*, figs 17 and 20.

figures the daughter chromosomes (with one exception to be referred to later on) vertically over one another. So far as my own experience goes, the daughter chromosomes in the great majority of cases are in reality laterally displaced one over the other to the extent shown in figs. 7 and 18. This lateral displacement is, however, much smaller than required by Gregoire's scheme, and is in fact just the thickness of one limb of the V-shaped chromosomes; so that the ends of one V lie beside those of the sister chromosome just before leaving the equatorial plate. This displacement of the daughter chromosomes with regard to one another may be seen in the figures of several investigators, *e.g.* in those of Miss. Sargent,¹ Strasburger and Mottier,² and indistinctly in one by Gregoire, himself the figure before alluded to.³

In all these figures the ends of the daughter chromosomes lying in the equatorial plane overlap, and are interlaced and present an appearance, which, I believe, could only be produced by the formation of each of the V-shaped daughter chromosomes from half of both portions of the original twisted chromosomes of the equatorial plate, each limb of the V being a longitudinal half of one portion.

In order to make the process clear, as I conceive it, reference to the accompanying diagrams will be necessary:—Fig. 12 represents diagrammatically a chromosome differentiated from the strepsinematous thread. It is composed of two portions twisted on each other, and each portion is a segment of the original dolichonematous thread, and has been brought into juxtaposition with a similar segment of the same thread and twisted round it. In the same diagram one of these portions is marked with spots and one with circles. A longitudinal division is also shown running down each portion. For the sake of clearness one half of one portion is marked with larger, and the other half with smaller circles. Similarly the adjacent portion is longitudinally divided into an half marked with large and an half marked with small spots. This longitudinal division has been recorded by several writers. In fig. 12 is represented the structure of a chromosome, with four free ends, such as is figured in fig. 3 and 4, while in fig. 13 is shown the structure of the common looped form of chromosome. For the sake of description we will designate each twisted portion (*i.e.*, that marked with circles *or* spots) of the double chromo-

¹ Ann. of Bot., Sept. 1896, fig. 23; and June, 1897, fig. 13.

² Ber. d. deutsch. bot. Ges. 1897 Taf. xv., fig. 1; and Mottier. Jahrb. f. wiss. Bot. 1897. Taf. iii., 15.

³ Loc. cit., fig. 21.

some a *primary chromosome*. Elsewhere I have given reasons for regarding these as homologous to the chromosomes of the vegetative mitoses.¹

When the chromosomes arrange themselves in the equatorial plate their greatest length is approximately horizontal and radially disposed. Apart from this their orientation seems very various. Thus the loops may lie towards the periphery or towards the centre, and the ends in planes parallel to or inclined to the equatorial plane. In the later stages of the equatorial plate the loops, where they are found, are broken transversely at the bend. In the equatorial plate the chromosomes become thick and lumpy. The twist of the primary chromosomes round one another becomes reduced usually to half or quarter a complete turn. The inner end of the chromosome becomes produced into two attenuate processes (fig. 14), which attach themselves to the fibres of the achromatic spindle (fig. 15). This attachment does not, I venture to think, take place as other writers assume, *i.e.* connecting the primary chromosomes to opposite poles; but rather each primary chromosome forms connections with fibres from both poles (fig. 15). This view has been forced on me not only by the consideration of the later stages, *e.g.* during the separation of the daughter chromosomes from the equatorial plate; but also by actual observation of the attachment the chromosomes to the spindle fibres. This observation is best made in sections cutting the equatorial plate obliquely. Then the chromosome may be seen as drawn in fig. 11. Careful focussing of a polar view of the equatorial plate will also sometimes reveal this method of attachment. While an equatorial view of the same, as in fig. 6, will often exhibit a chromosome like that on the right of the figure in which the pointed processes of the chromosome are seen distinctly connecting each primary chromosome to upper and lower fibres. As these attenuate processes have all the appearance of a viscid substance it will be understood that this method of attachment may be effected, no matter how the chromosome is oriented in the equatorial plate, provided that its greatest length is radial. In the case of the more uncommon longer chromosomes which assume the bend in the equatorial plate before alluded to, the attachment taking place in the middle of the chromosome is difficult to make out. But in all probability it is effected in the same manner, *i.e.* each primary chromosome forms connections with the fibres of both poles.

¹Chromosomes of *Lilium longiflorum*. Proc. R.I.A. *loc. cit.* Cf. Belajeff Ber. d. deutsch. bot. Ges. 1898; Ueber Reductionstheilen des Pflanzenkernes.

Figs. 14, 15, 16, and 17 represent the equatorial aspect of a chromosome in the equatorial plate. Fig. 14 shows the chromosome in the plate before the processes have become drawn out along the spindle-fibres. In 15 the processes of the primary chromosome marked with circles are shown connected with fibres both from the north pole and the south pole. The half marked with small circles is attached to the north polar fibres, and that with the larger circles to the fibres of the south pole. In the same manner the longitudinal halves of the dotted primary chromosome are connected with opposite poles. When the splitting of the chromosomes is effected, the process continues, as is represented by figs. 16 and 17. The half marked with large circles draws out between the halves marked with small dots and small circles. These latter are drawn towards the north pole, and form a V-shaped daughter chromosome, composed of half the dotted primary chromosome and half of the primary chromosome marked with circles. The limbs of the V are caused to diverge by the drawing out of the half marked with large circles between them. The V formed simultaneously of the remaining halves of the primary chromosomes is drawn to the south pole. Its limbs are splayed by the fact that the half marked with small dots is drawn out between them. Fig. 17 will make the final stage of the process clear. Fig. 18 represents the general appearance of the two daughter chromosomes leaving the equatorial and viewed in a radial direction looking towards the centre. The ends of the limbs are often twisted slightly round each other, as shown in this figure; sometimes, however, they lie side by side. As the chromosomes draw apart from one another the ends untwist, until finally, when just parting asunder, they are vertically over one another in the position most usually figured. But, again, it very often happens that while the twist of one pair of limbs unravels, the other pair remain engaged, and so an appearance such as is shown in fig. 7 is produced. This appearance is also figured by Strasburgher and Mottier.¹ In the diaster this retardation manifests itself by the fact, that one limb of the V as it tends towards the pole is drawn out and very attenuate towards the apex (fig. 8), and lags behind the other.

From the above description of the formation of the chromosomes, and their division in the nuclear plate, it will be seen that the author does not believe that this first mitosis of the spore-mother-cells is a differential or "reducing" division. The two daughter nuclei receive half of each primary chromosome, which is itself a segment of the

¹ Ber. d. deutsch. bot. Ges., 1897. Taf. xv., fig. 1.

original dolichonematous thread. Whether or no, a differential division is secured by the succeeding mitosis of the daughter nuclei is a matter of dispute. Belajeff,¹ Guignard,² and Gregoire,³ all maintain that no true longitudinal fission of the chromosomes takes place in that mitosis. Consequently, if we accept the scheme put forward in this note, a reducing division does take place in the formation of the sexual cells. This position is accepted by Belajeff, who believes that there is but one longitudinal fission in the first mitosis. Guignard and Gregoire urge that although there is no longitudinal fission in the second mitosis, that there is a double fission in the first, which compensates for the want of one in the second. The chromosomes which have arisen by the second longitudinal fission of the first mitosis come to lie and to end, and in the second mitosis separate by transverse fission.

General agreement on this difficult point, as to whether there is an actual longitudinal fission in the second mitosis or not, is far from being attained. Thus Miss Sargent, Strasburger⁴ and Mottier, and myself, have convinced ourselves that at least all the appearances of longitudinal cleavage are presented in this second mitosis. If this view is accepted the scheme advocated here involves no reducing division.

In conclusion, I wish to express my thanks to Mr. Charles Green, who kindly drew several of the diagrams used in this note, and helped me in the construction of several of the remainder.

¹ Ueber die Reductionstheilung des Pflanzenkernes. Ber. d. deutsch. bot. Ges., 1898.

² *Loc. cit.*

³ *Loc. cit.*

⁴ NOTE ADDED IN THE PRESS.—Still more recently Strasburger has returned again to the view that no longitudinal cleavage takes place in this second mitosis. Ueber Reductionstheilung, &c., in Pflanzenreich. Jena, 1900.

EXPLANATION OF PLATES I. AND II.

[Figures 1-11 all *camera lucida* drawings ; magnification, 1000 diameters.]

Figures.

1. Cell with nucleus in dolichonema stage.
 2. Cell with nucleus in strepsinema stage.
 - 3 and 4. Formation and thickening of chromosomes. The primary chromosomes are cross-hatched in different directions.
 5. Polar view of the nuclear plate.
 6. Equatorial view of the same.
 7. Chromosomes leaving the nuclear plate. On the right the lateral displacement of the daughter chromosomes relative to one another is shown.
 8. Daughter chromosomes approaching the poles.
 9. Portions of the strepsinematous thread.
 10. Tangential section of a nucleus showing the looping of the dolichonematous thread to form the strepsinematous condition.
 11. Oblique view of a nuclear plate showing the connexion of each primary chromosome with each pole.
 - 12 to 18. Diagrams to illustrate the behaviour of the chromosomes during the first mitosis of the spore-mother-cells.
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II.

ON THE PLACE OF THE *AUSDEHNUNGSLEHRE* IN THE GENERAL ASSOCIATIVE ALGEBRA OF THE QUATERNION TYPE. BY CHARLES J. JOLY, M.A., F.T.C.D.

[Read, FEBRUARY 13, 1900.]

THERE is a cardinal distinction between Quaternions and other algebraic systems of space analysis. So far as I know Quaternions and algebras of the Quaternion type alone are both Associative and Distributive. Of the other systems, some are associative but not distributive, some distributive but not associative. The *Ausdehnungslehre* is distributive but only partially associative.

It is worth while inquiring whether the *Ausdehnungslehre* can be included in the distributive and associative algebra whose units obey the laws of Quaternions

$$i^2 = -1 \quad \text{and} \quad i, i + i, i = 0. \quad (\Delta)$$

We shall, in what follows, use the term *vector* (when not otherwise qualified) to denote a linear function of some or all of the units with scalar coefficients, and we shall generally employ small Greek letters for the symbols of vectors. Also we shall restrict the words *product*, *multiply*, &c. to the results of operations and to operations in accordance with the laws of the units. Further, when we speak of a set of units, we imply that they satisfy equations (Δ).

If in accordance with (Δ) we form the complete product or simply the *product* of any number of vectors $\pi_1, \pi_2, \dots \pi_n$ and reduce as far as possible by the aid of the fundamental relations, it is obvious that the result will, in general, consist of sums of irreducible products of the units of the orders $n, n-2, n-4$, &c., each product being multiplied by a scalar coefficient. Hence we may write if we separate these sums of products into groups of the same order,

$$\begin{aligned} \pi_1 \pi_2 \pi_3 \dots \pi_n &= V_n \pi_1 \pi_2 \dots \pi_n + V_{n-2} \pi_1 \pi_2 \dots \pi_n + \&c. \\ &= \sum_m V_{n-2m} \pi_1 \pi_2 \dots \pi_n, \end{aligned}$$

V_{n-2m} being a sign of selection of groups of products of the units of the order indicated by the suffix.

It is apparent if n exceeds the number of the units, that the group V_n does not occur. In fact the highest order that can occur is given by the equation

$$n - 2m = N, \quad \text{or by} \quad n - 2m = N - 1,$$

where N is the number of the units, according as n and N are both odd or even, as in the first case, or one even and the other odd as in the second.

We shall now show that there is the closest analogy between a Grassmann combinatorial product of n point symbols and the function $V_n \varpi_1 \varpi_2 \dots \varpi_n$. We shall suppose, in the first place, n to be less than N , the number of the units.

Comparing, then, a combinatorial "product" of point symbols

$$p_1 p_2 p_3 \dots p_n,$$

and the group of highest order in the product of n vectors

$$V_n \varpi_1 \varpi_2 \varpi_3 \dots \varpi_n,$$

we see at once the following points of similarity:—

(1). Both vanish if two constituents are the same. For if

$$\varpi_1 = \varpi_2 = x_1 i_1 + x_2 i_2 + \dots + x_N i_N, \quad \varpi_1^2 = -x_1^2 - x_2^2 - \dots - x_N^2,$$

and the complete product $\varpi_1^2 \varpi_3 \varpi_4 \dots \varpi_n$ has its highest group of the order $n - 2$ at most.

(2). No change is produced in either if we replace p_2 and ϖ_2 by $p_2 + t p_1$ and $\varpi_2 + t \varpi_1$, t being a scalar.

(3). Interchange of contiguous symbols changes the sign of both. We may replace ϖ_2 by $t \varpi_1 + \varpi'_2$ where ϖ'_2 is at right angles to ϖ_1 , or where $\varpi_1 \varpi'_2 = -\varpi'_2 \varpi_1$. Hence

$$V_n \varpi_1 \varpi_2 \dots \varpi_n = V_n \varpi_1 \varpi'_2 \dots \varpi_n = -V_n \varpi'_2 \varpi_1 \dots \varpi_n = -V_n \varpi_2 \varpi_1 \varpi_3 \dots \varpi_n.$$

(4). Both obey the associative law expressed by

$$p_1 p_2 \dots p_m \cdot p_{m+1} \dots p_n$$

$$\text{and} \quad V_n V_m \varpi_1 \varpi_2 \dots \varpi_m V_{n-m} \varpi_{m+1} \dots \varpi_n.$$

For, in forming the group of highest order in the complete product $\varpi_1 \varpi_2 \dots \varpi_m \cdot \varpi_{m+1} \dots \varpi_n$, it is useless to retain any but the highest

groups in the sub-products $\varpi_1 \varpi_2 \dots \varpi_m$ and $\varpi_{m+1} \dots \varpi_n$. In other words, in the above expression V_m and V_{n-m} are superfluous symbols.

(5). We may replace the expressions by

$$p_1 l_2 l_3 \dots l_n$$

and

$$V_n \varpi_1 \lambda_2 \lambda_3 \dots \lambda_n$$

where

$$l_2 = p_2 - p_1, \text{ \&c., and } \lambda_2 = \varpi_2 - \varpi_1.$$

(6). We can, by assuming the origin to be arbitrary, suppose the vector ϖ_1 to be the symbol of a point.¹ We have $\lambda_2 = \varpi_2 - \varpi_1$ a vector equal to that between the points, and $V_2 \varpi_1 \lambda_2$ we may interpret as a point vector; also the interpretations of $V_3 \varpi_1 \lambda_2 \lambda_3$, &c. are obvious.

We may, in forming the product, replace ϖ_2 by $t\varpi_1 + \eta_2$ where η_2 is at right angles to ϖ_1 , we may put $\varpi_3 = t'\varpi_1 + t''\eta_2 + \eta_3$, where η_3 is at right angles to ϖ_1 and η_2 or to ϖ_1 and η_3 , and we have finally

$$V_n \varpi_1 \varpi_2 \varpi_3 \dots \varpi_n = \varpi_1 \eta_2 \eta_3 \dots \eta_n,$$

the symbol V_n being unnecessary on the right-hand side, as the product is irreducible.

From this follow all Grassmann's conceptions of the continuous products of points. The product of two is the point-line joining them; the product of three the point-plane determined by their completed parallelogram; the product of four the point-volume of the completed parallelepiped determined by the four points.

An apparent break in the parallelism occurs when the order of the product equals the number of the units. Grassmann defines the products of this order to be scalars. In our case $V_N \varpi_1 \varpi_2 \dots \varpi_N$ is equal to a scalar multiplied by $\Omega (= i_1 i_2 \dots i_N)$ the product of all the units.² For present purposes we need not at all inquire into the nature of Ω . We are entitled to identify where n is less than N , a Grassmann "product" with $V_n \varpi_1 \varpi_2 \dots \varpi_n$; and where n equals N we may identify a Grassmann product with the scalar

$$V_N \varpi_1 \varpi_2 \dots \varpi_N \cdot \Omega^{-1}.$$

Having reached the N^{th} order in a product, Grassmann equates his result to a scalar and forms successive products by multiplying this

¹ This is precisely what Hamilton does.

² It is easy to *prove* by the principles of the present paper that Ω is the same for all sets of units in the space under consideration.

scalar by new points. At this place the associative law breaks down. We can imitate Grassmann's procedure not by *ear-marking* the function

$$p_1 p_2 p_3 \dots p_N$$

but by dividing the function $V_N w_1 w_2 \dots w_N$ by Ω , and proceeding along the associative lines of our algebra. Of course the laws of the algebra afford the equation

$$\Omega^2 = (-1)^{N+(N-1)+(N-2)} = (-1)^{\frac{1}{2}N(N+1)}.$$

We have the Grassmann product

$$p_1 p_2 \dots p_N p_{N+1} \dots p_{N+m},$$

and our equivalent

$$V_N w_1 w_2 \dots w_N \Omega^{-1} V_m w_{N+1} w_{N+2} \dots w_{N+m}.$$

We have moreover the conception of *complements* expressed by the functions

$$V_n w_1 w_2 \dots w_n \quad \text{and} \quad V_{N-n} w_{n+1} w_{n+2} \dots w_N \cdot \Omega^{-1}.$$

We have still to see how we can include in the associative algebra propositions like the following:—"The product of two posited quantities which have no common figure is some multiple of the connecting figure," or "The product of the two posited quantities which must have a common figure is the common figure multiplied by a number."

Take these two functions having a common figure

$$V_n w_1 w_2 \dots w_n \quad \text{and} \quad V_m \rho_1 \rho_2 \dots \rho_m,$$

and, by the process of (6.), reduce them to the form

$$V_n \eta_1 \epsilon_2 \epsilon_3 \dots \epsilon_t \sigma_1 \sigma_2 \dots \sigma_{n-t} \quad \text{and} \quad V_m \eta_1 \epsilon_2 \epsilon_3 \dots \epsilon_t \tau_1 \tau_2 \dots \tau_{m-t},$$

where η_1 is the point symbol of some point in the common figure, and $\epsilon_2 \epsilon_3$, &c. are vectors of the common figure. For these we may write

$$V_i \eta_1 \epsilon_2 \epsilon_3 \dots \epsilon_t \cdot V_{n-t} \sigma_1 \sigma_2 \dots \sigma_{n-t} \quad \text{and} \quad V_i \eta_1 \epsilon_2 \epsilon_3 \dots \epsilon_t \cdot V_{m-t} \tau_1 \tau_2 \dots \tau_{m-t};$$

since the symbols V_n and V_m are superfluous, σ and τ being exclusive of η and ϵ , or at right angles to them. The complete product of these is

$$\pm V_i \eta_1 \epsilon_2 \epsilon_3 \dots \epsilon_t \cdot V_i \eta_1 \epsilon_2 \epsilon_3 \dots \epsilon_t \cdot V_{n-t} \sigma_1 \sigma_2 \dots \sigma_{n-t} \cdot V_{m-t} \tau_1 \tau_2 \dots \tau_{m-t},$$

or if we attend particularly to the sign, though this is immaterial, we

must replace \pm by the definite value $(-1)^{n-t}$. From this complete product, if we select the part

$$V_{\eta_1 \epsilon_2 \epsilon_3 \dots \epsilon_t} V_{\eta_{t+1} \epsilon_1 \epsilon_2 \dots \epsilon_t \sigma_1 \sigma_2 \dots \sigma_{n-t} \tau_1 \tau_2 \dots \tau_{m-t}},$$

we have the Grassmann "product" when we divide by Ω , the product of a *set* of $n + m - t$ units in the space containing both figures. The symbols V_{n-t} and V_{m-t} are suppressed, being unnecessary.

When the functions have no common figure, the Grassmann product is simply

$$V_{n+n} w_1 w_2 \dots w_n \rho_1 \rho_2 \dots \rho_m.$$

As examples, take two-point line vectors $V_2 w_1 w_2$ and $V_2 \rho_1 \rho_2$. If they are contained in a common plane, since they have a common point, they may be replaced by $V_2 w_0 w'_1$ and $V_2 w_0 w'_2$, and the Grassmann product is $w_0 V_2 w_0 w'_1 w'_2$ divided by the product of the three units when the product is *planimetric*. If they have no common point, the "product" is $V_4 w_1 w_2 \rho_1 \rho_2$, divided by the product of the four units when the product is *stereometric*. The principles of the associative algebra allow us to write

$$V_4 w_1 w_2 \rho_1 \rho_2 = V_4 V_2 w_1 w_2 V_2 \rho_1 \rho_2 = V_4 V_2 \rho_1 \rho_2 V_2 w_1 w_2$$

by the law of interchanges or otherwise. Hence we see that "multiplication" of two lines in space is a "commutative operation."

It would be tedious to dwell on other parallelisms between the *Ausdehnungslehre* and the exceedingly restricted use of the general associative algebra to which it corresponds. I may mention, however, that Grassmann's quotients or matrices are simply operators of a very special kind of the type $q () q^{-1}$ considered in a paper on "The Associative Algebra of Hyper-space."¹ Also the continued Grassmann product $V_n w_1 w_2 \dots w_n$ may be expressed in the form of a determinant

$$\begin{vmatrix} 1 & w_1 & w_2 & \dots & w_n \\ n & w_1 & w_2 & \dots & w_n \\ & \cdot & \cdot & \cdot & \cdot \\ & w_1 & w_2 & \dots & w_n \end{vmatrix}$$

consisting of the same row of vectors repeated n times, if we agree that the determinant shall be expanded just as if its constituents were

¹ Proc. R. I. A., 3rd Ser., Vol. V., No. 1.

scalars, with the single restriction, that the order of the vectors in the expansion shall take the order of their positions in the columns.

We thus conclude that the *Ausdehnungslehre*, as adapted to a space of n dimensions, may be regarded as a part of the associative algebra of $n + 1$ dimensions limited by more or less arbitrary restrictions. We see that the conceptions of progressive and regressive multiplication are partial aspects of a complete operation which alone is entitled to the name multiplication. In this respect the *Ausdehnungslehre* resembles several systems of vectorial analysis, and for very similar reasons. The point symbol is introduced by the artifice of leaving the origin arbitrary, not as Hamilton did in the space under investigation, but in a space of one dimension higher.

III.

ON THE EPIDIORITE AND MICA SCHISTS OF KILLINEY PARK, CO. DUBLIN. BY PROF. J. P. O'REILLY, C.E.

(PLATES III. AND IV.).

[Read JANUARY 22, 1900.]

THE relations of the granite with the mica schists in the neighbourhood of Killiney, Co. Dublin, are very fully gone into in the memoir explanatory of the sheets of the Geological Survey of Ireland, Nos. 102 and 112 (1875). On p. 33 particulars are given as to the mica schist, and its alteration from Lower Silurian slate, which, the writer of the memoir observes, may be more especially seen over the rugged ground of Roche's Hill and that lying to the west of Killiney Park. Describing the Lower Silurian slate, he says:—

"This mass of slate consists of beds of gray mica slate, with bands of gray, close-grained grits, usually micaceous, but very compact, the dips of all being invariably to the south-east, at from 40° to 60° . This high, steady inclination of the beds gives them the appearance of dipping down into the granite, and on a level surface would make them seem as if they were interstratified with it. The fall of the ground, however, and the exposure in the cliffs show that the beds are cut off by the granite below, and that they rest in wedge-shaped troughs of that rock, the outline of which has no relation to the dip or strike of the beds."

At p. 34, describing in detail the relations of the mica schists and granites to the west of the patch on which is situated Victoria Castle, he says:—

"To the west of this the slates appear in great force, and extend northwards into the granite under the village of Killiney, and close to the elevation marked 480 on the map, having, however, a long narrow tongue of granite stretching into them for the distance of 350 yards between Killiney and the elevation just named. The maximum width of the mass of slate is over 500 yards. To the south of Killiney village the dip of these beds is south, at 70° to 80° .

inclined from the granite, or they are vertical, with an east-to-west strike. And between Killiney Lodge and Killiney Park they seem as if interstratified with lenticular dykes of granite, adjoining to which they become full of crystals of andalusite. The boundary of the slate and granite, as it is observed to the west of Killiney Park, is very intricate, one rock entering the other in long dykes and tongues, as may be seen by reference to the south-west corner of the sketch-map given on fig. 10, p. 35.

"The remaining portion of the boundary between the slates and the granite southwards, from Ballybrack cross-roads to the edge of the map, a distance of a mile and a-quarter, is quite concealed by a thick deposit of drift, so that the boundary line between them is a rather hypothetical one, being drawn from the form of the ground only."

It will be observed that, in describing this particular part of the granite lying about Killiney, no mention is made of "trap rocks" as occurring in the formation, but in the description of the beds at Howth, and those shown in the south-west corner of the map, distinct reference is made to them. Thus, at p. 36, he says:—

"When the unaltered Silurian slates appear in the south-west corner of the map, they are plentifully associated with fairly crystalline trap rock, which is sometimes porphyritic, occurring in large and small lenticular masses, as well as in dykes and veins of narrow dimensions. and along with these are equally numerous beds of compact gray ash."

In the present paper I propose to examine the beds occurring in the locality referred to on p. 34 of the Memoir, and described as lying between Killiney Lodge and Killiney Park. Owing to the development of residential properties in this locality, and the consequent alterations in the old boundary lines since the date of the Memoir in question, it is necessary, in order that the lie of the ground in the locality may be better understood, to give the names of the present residences and grounds, as marked on the more recent Ordnance maps, which are laid down on a scale of five feet to the mile, and numbered xxiii. 97 and xxvi. 17.

Examining these, it will be observed that the road which branches off to the W.S.W. from Killiney village at Glenalua Lodge turns to the S.W. at Venetian Cottage, and continues to Glenalua Lodge, where it inflects to the W.N.W. at the entrance to Hendri. Quite near this it crosses the well-marked fault existing between the granite and the mica schist in this locality. The direction of this fault is about N. 17° 38' E., and is remarkable in that, as pointed out in my

paper "On the Directions of the main lines of Jointing about the Bay of Dublin" (R.I.A. Proceedings, ser. II., vol. iv., p. 259), it is one of the set of joints the direction of which corresponds or is parallel to the coast-line direction between Carnsore Point and Wicklow Head, and also to that of the boundary line which limits the granite of Wicklow on the west side between Castledermott and Goresbridge. In the table of "Frequency of Occurrence," given on p. 304 of same paper, the direction N. $16^{\circ} 31'$ E. (the mean of 26 occurrences observed) is shown to be the most frequent in the locality considered, and therefore geologically of structural importance.

Near the gateway of Glenalua Lodge, when coming from Killiney village, the observer meets on the north side, or right hand, a rough piece of ground, showing outcrops of the mica schists so characteristic of the locality, and at one or two points, immediately under the boundary wall of Glenalua Lodge, outcrops of a rock which will be further considered. Apparently this was the quarry of slate rock referred to in the Geological Survey Memoir already cited, and from which the stones found in its boundary walls, and more particularly in the coping of the boundary wall of the quarry next the road, were taken; the outcrops of the rock in question, being extremely hard, and not easily worked, were left outstanding, and therefore quite accessible for examination. The fault already referred to traverses this old quarry field, and passes into the adjacent grounds of the Lodge. At the point marked B on the accompanying enlarged plan of the ground, is a wicket-gate, giving ingress on to the hill, to the west of Stoneleigh; here a barely traceable path skirts the margin of the granite on its south side, and leads to the back-entrance of that property. From this entrance (marked C on the accompanying plan) there extends along the boundary wall, to the gate leading into Killiney Park, a patch of ground showing markedly the mica schist outcrops, tongued by the granite as described in the Memoir, and in certain bands thereof, marked on the plan with the letter D, a crystalline rock of the same nature as that which outcrops in the old quarry at Glenalua Lodge already referred to, bearing every evidence of its metamorphism from the associated slate rock and mica schists. This rock, marked on the enlarged map accompanying (D. m. s.) (Dioritic mica schist), is of a dark-green colour, usually fine grained, highly crystalline, sometimes porphyroidal, and where most markedly crystalline breaking easily into rhomboidal fragments, very much after the way of certain feldspathic rocks. The mean density of a sample was found to be 3.105, and thin sections of the same piece showed, under polarized

light, not only the hornblendic and quartz granules, but also abundant magnetite and Titanic iron.¹

A sample of the rock was submitted for analysis to Mr. S. Templeton, As. R.C.S. Dub., and F.G.S. of Belfast, and he reported the composition thereof as follows:—

SiO ₂ ,	50·16	} = 99·695.
Al ₂ O ₃,	.	.	.	.	14·00
FeO,	.	.	.	.	14·04 ²
MgO,	.	.	.	.	7·62
CaO,	.	.	.	.	9·60
Na ₂ O,	.	.	.	.	3·97
H ₂ O,	.	.	.	.	0·39

This may be compared with the following analysis:—

[SP. GRAVITY = 3·11.]

	I. ³	II. ⁴
SiO ₂ ,	48·90	49·78
Al ₂ O ₃ ,	16·02	13·13
Fe ₂ O ₃ ,	12·52	4·35
FeO,	1·12	11·71
MnO,	0·04	—
CaO,	8·22	8·92
MgO,	6·24	5·40
K ₂ O,	1·17	1·05
Na ₂ O,	3·87	2·39
TiO ₂ ,	0·26	2·22
Loss on ignition,	1·66	H ₂ O, 1·14 CO ₂ , 0·10
	100·2	100·19

Teal says, p. 197:—

“*Highlands of Scotland*.—Basic, igneous rocks, essentially composed of plagioclase and pyroxene, are found associated with the gneisses and schists of the region. They have not as yet received

¹ See notice of it by Henry J. Seymour, B.A., in the *Irish Naturalist*, 1896, p. 137.

² A small fraction of the iron was found to exist as Fe₂O₃.

³ From Zirkel's *Lehrbuch der Petrographie* (vol. ii. 1894, p. 485) of a quartzose, diorite from Swartzenberg (Vosges).

⁴ Bulk analysis of a hornblende schist taken from Teale's *British Petrography*, 1888, p. 200.

much attention at the hands of the petrographers. A dyke occurring in the Hebridean gneissic systems of Sutherlandshire, near the village of Scourie, has been examined by the author, and has been already referred to as illustrating the passage of a massive igneous rock into a crystallized schist. It also illustrates the passage of a massive plagioclase-pyroxene rock into a massive plagioclase-hornblende rock (epidiorite (see pl. 20).

"The gradual replacement of the pyroxene by hornblende is the most striking figure. The resulting hornblende may be fibrous actinolite or compact."

(The fig. 25, three-fourths natural size, represents well the Killiney rock under consideration.)

At p. 200 he says :—

"There seems no reason to doubt that the change of the plagioclase-pyroxene rock to epidiorite and hornblende schist as the result of the dynamic metamorphism which has affected the district. Where there has been no differential movement in the rock-mass, we have the massive epidiorite; where differential movement has taken place, the schist has been produced. Why certain portions of the dyke have retained their original characters, whilst other portions have been so completely metamorphosed, we cannot at present explain. Many dykes similar to that of Scourie doubtless occur in the Highlands of Scotland; and it is quite possible that many bands of hornblende schist may represent dykes, or sheets, which have been incorporated, as it were, with the general gneissic series."

That the mica schist beds of Killiney have undergone metamorphism, and that the epidiorite in question is a result of that action there, is suggested, all the more strongly the more carefully the ground, as a whole, is studied. On p. 32 of the Memoir cited occurs a foot-note by Professor Hull, with reference to the excellent sketch, by Du Noyer, of the south-east end of the line of junction of the mica schist with the granite, which appears as a woodcut on p. 38 of the Memoir, and which is mainly intended to show the remarkable distribution of the mica in the granite at the point of contact. Professor Hull says:—"The boss of granite figured on p. 33 appears to me to be simply a case of foliation, and an evidence that this portion of the granite is of metamorphic origin."

The character here presented by the rocks may be traced, more or less clearly, along the main line of contact of the mica schists with the granite, so that if a metamorphic action is to be presumed in the one case, it may equally well be admitted for the rest.

The examination of the epidiorite in this section was made by Mr. Henry J. Seymour, B.A., of the Irish Geological Survey, and a description thereof formed the subject of a communication by him to the Dublin Microscopical Club (see *Irish Naturalist*, 1896, p. 137). In a subsequent letter to me he says:—

“The description given by Teal on p. 198, *Br. Petrography* (plates 18 and 20) applies perfectly to this rock from Killiney Park (see especially plate 20, fig. 2). There is little doubt that most of the feldspar, and practically all the hornblende, is secondary, and that the rock has resulted from the dynamic metamorphism of a basic pyroxene aphanite, or dolerite. The secondary character of the amphibole is best seen in the slice parallel to the plane of schistosity, and in which the ferro-magnesian constituent is seen to be actinolite. In this slide also the crushing out of the magnetic iron element is well shown. Some zoisite occurs in the rock, and is probably derived from the alteration of the original feldspathic constituent.”

The epidiorite outcrops on Vico Road, at a point about 80 to a 100 yards north of the gate which gives entrance to Victoria Park, in this locality. The water-channel along the footpath of the road from the cross-roads at Ballybrack to Shanganagh is paved with smooth, water-worn cobbles of this rock, which, in all probability, were taken from the seashore, and which would tend to indicate the presence of an outcrop of the rock on the shore, though probably now completely covered over by the shingle and sand thrown up by the sea.

The mica schists which enclose the epidiorites, and with which this is so intimately connected, presents characteristics which may be found in certain beds of the Bray Head series of rocks, some of them being of very fine grain, and therefore not at once recognisable as mica schist. In the railway cutting south of the Brandyhole Tunnel, there is a well-marked outcrop of this mica schist; it also occurs in the beds which show themselves on the path about 90 yards south of Lord Meath's gate-house. It would be very interesting to compare this mica schist with that of Killiney Park, since the rocks outcropping here might really be the same series as that found at Bray Head, but in a much more metamorphosed state. A sample of the Killiney mica schist was submitted to Mr. W. S. Warren, chemist, of Westland-row, for analysis, and he reported thereon as follows:—

“Received December 15th, 1896, from Prof. J. P. O'Reilly, c.e., Royal College of Science, Dublin, a sample of a crude rock, marked

No. 76. I have made a minute and careful examination of this sample, and find it to contain—

	Per cent.
SiO ₂ ,	58·102
Fe ₂ O ₃ ,	3·522
FeO,	4·086
Al ₂ O ₃ ,	24·285
CaO,	1·350
MgO,	2·066
NiO,	0·015
MnO,	Trace.
TiO ₂ ,	0·961
Tungsten,	0·212
K ₂ O,	1·270
Na ₂ O,	3·512
Loss on ignition,	0·101
	<hr/> 100·082

“In the special analysis for NiO and Tungsten, 100 grammes of sample were acted upon. There are slight indications of V₂O₅ being present, but in such minute quantities, that it would be nearly impossible to make a rough guess at the quantity, as when 200 grammes were acted upon, the colour-test was applied, and even then the indication for V₂O₅ were not sure at all.

(Signed),

“W. S. WARREN.”

The presence of WO₃ was considered so interesting, that a portion of the sample was submitted for examination to Mr. Hugh Ramage, Assistant Chemist in the Laboratory of the Royal College of Science, Dublin, and F.C.S., and he, after most careful and special testing for Tungsten, was unable to detect any trace of it in the sample submitted to him. Mr. Warren's analysis is, however, given as bearing on the question of the relations of the rocks in Killiney Park one with the other, and may be of interest as regards the mica schists of Bray Head, to be yet examined.

IV.

THE BEAUFORT'S DYKE, OFF THE COAST OF THE MULL OF GALLOWAY. By G. H. KINAHAN, District Surveyor (Retired), H. M. Geological Survey.

[PLATE V.]

[Read, APRIL 21, 1900.]

THE proposed construction of a Submarine Tunnel from Ireland to Scotland has developed attention to one of the most remarkable natural phenomena in connexion with the actions of wind and tidal currents in the deep sea—that is, the travelling sands and gravels, and their adjuncts, in the gulch called the “Beaufort's Dyke,” off the coast of the Mull of Galloway.

In the sea between Ireland and Great Britain there are various perplexing and unexplained deep-sea currents that go under various names according to the localities, such as—races, dykes, ditches, undersucks, etc. These are conspicuous in connection with the sand-banks off the Leinster coast. The “races” are not the ordinary “tidal race” in a narrow channel, but a current that starts off nearly perpendicularly to the coast line, towards the “tail” of one of the banks. All these different currents vary in accordance with the state of the tide; being generally more conspicuous during the spring tides than the neaps. These variations, especially of the undersucks and ditches, are so vagrant that, as a general rule, the fishermen are afraid to shoot their nets inside the banks off the south-east coast. On this account it was proposed, some fifteen years ago, that the Royal Society should apportion a part of their Scientific Grant to investigate these obscure currents. As, however, at that time, there was no competent person disengaged, who would undertake the investigations, the proposal fell to the ground.

All these peculiar currents are of great interest; but, at the present time, we are specially engaged with those that have a connexion with the “Beaufort's Dyke.” Formerly all the best authorities

insisted that tidal and wind waves were inoperative below very limited depths. This subject was studied during a series of years by the writer, who proved, by indisputable evidence, that the actions of the currents, due to the combination of tidal and wind waves, was much deeper than was supposed.

The results of these inquiries have appeared in the Publications of this Academy, the Institutions of Civil Engineers, England and Ireland, and in those of the Geological Societies of England, Ireland, Edinburgh, Glasgow, Manchester, etc.

The earlier observers may be excused, as it was then generally believed, that the greatest denudation took place at low water. This supposition was very excusable, as it would appear obvious that tidal currents have more effect at low-water than previously. Now, however, it is known that the greater the depth of the water, the greater the force; consequently the greatest denudation takes place at the high-water of the spring-tides—that is, the denudation is in ratio to the depth of the water. To go fully into this subject would occupy a considerable space: we may, therefore, take it as proved, and refer those interested to the reports on the subject. It can, however, be seen that this being proved, the original ideas on tidal denudation and effects must be considerably modified; more especially as the travelling-sands, gravels, and their adjuncts, in the “Beaufort's Dyke,” show conditions that vary from any previous records, as there are sands, gravels, and their adjuncts, at depths of from 120 to 144 fathoms (600 to 864 feet in that place), that are carried backward and forward similarly to those on an ordinary sea-beach.

The early surveyors used sounding-lines of limited lengths, so that, on their charts, all exceptional deeps are unrecorded; we therefore cannot give the early history of the “Beaufort's Dyke,” as no chart could be found in which these depths are recorded earlier than 1867. The next chart is dated 1879; then we have one in 1885, and others in 1890, 1894, 1897, and 1898. The map lately published in the *Daily Graphic* seems to have been made from the soundings taken early in either 1897 or 1898, but there is no chart now to be bought showing a similar outline. From the 1897 chart, we learn that then the gulch forked to the northward, and had lessened in that direction: it had also shoaled-up very much; while south-east of the Bill of the Mull, there was a remarkable deep of over 120 fathoms. Shoaling-up seems also to have taken place in 1879; while in 1869 the gulch was cleared in a great measure of the sands and their adjuncts. When the 1897 chart was made, the shallow in the gulch was on a line

between Donaghadee and the Scotch coast, at a point about half-way between the Bill of the Mull and Port Patrick.

According to the information on the charts, each chart offered for sale is stated to be up to date, containing the latest information. Sometimes, however, they seem to let their work get into arrears; as in the early part of 1897, when I first took up this inquiry, there were six different charts of the area—the chart of the British Isles, 1867; a chart dated 1879; another of 1885; another of 1890; another of 1894; and, another of 1897; since then there has been a great change, as most of these charts have been cancelled and amalgamated into three or four, viz. :—chart of British Isles (up to date); a chart, No. I., Irish Channel, which seems, at least in part, old, 1825 A; and, chart No. 45, east coast of Ireland; also, a map of the west coast of Scotland, very similar to 45, east Ireland. This Irish chart is dated July, 1897, and seems to be more recent than the Scotch chart. In the *Daily Graphic*, July, 1899, Mr. Barton published a chart—presumably this is a correct copy from one of the cancelled charts, as it is different to the charts now on sale. The last chart (No. I., Irish Channel) is said to be corrected up to November, 1898. It is a most elaborate chart, as in it the colour as well as the composition of the soundings are given.

The following Table was drawn up from the charts procurable early in 1897. The present chart of 1897 is slightly different from the early one; to this Table are added the figures taken from the 1898 chart :—A. column gives the date, B. the soundings on a line from the Gobbins, Larne, to Corsewall, and C. those on the direct line from Donaghadee to Port Patrick :—

A.	B.	C.
1867	126 to 138 fathoms.	138 to 144 fathoms.
1879	126 ,,	80 ,,
1885	123 ,,	123 ,,
1890	139 ,,	117 ,,
1894	126 to 139 ,,	117 ,,
1897	130 to 139 ,,	146 ,,
1898	127 ,,	140 ,,

It is to be regretted that I cannot produce the chart of 1894, as

some remarkable changes occurred between that year and 1897 in places, the gulch being considerably deepened, while the northern portion has become forked, a deep new branch having been scooped out to the west of the northern portion of the dyke; as this branch appears in charts 1897 and 1898, and partially in Barton's chart, we may presume his chart was slightly prior to the others.

To what causes are these deep-sea currents due? First, it has to be considered:—to what is the genesis of the gulch due? Elsewhere it has been suggested that the "Beaufort's Dyke," or gulch, has a connexion with a compound fault—a right-hand heave that can be clearly seen in this portion of the channel. This fault is probably a "trough fault," that is, a combination of two or more lines of breakage and shiftings; these either formed an open shrinkage fissure, or left the materials in the "trough fault," so broken up, that they were easily lifted and carried away by the ice at the time when the great glacier occupied the valley of the basin of the present Irish Sea. One or other, or both, of these forces, combined with the broken-up "fault rock," seems to have been the origin of the gulch. Since then, we know from the sounding in the charts (1867, 1879, 1885, 1890, 1894, 1897, and 1898) that the sands, gravels, etc., in this chasm have been continually shifting, which movements must be due to the tidal-waves in combination with wind-waves.

Haughton, from his investigation of the Tides between Great Britain and Ireland, has proved that the "Head of the tide surface," in the channel, is in the neighbourhood of the Isle of Man.¹ He defines the "Head of a tide," a place where the waters are "dumped" up, rising to the greatest height, but having no currents. To the southward and northward of the "Head of the tide," in the Irish Sea, there are the "Hinge lines," or the places where there is the least rise of tide and the greatest currents. My experience and investigations have been principally in connexion with the sea to the southward of the "Head of the tide"; but, at the same time, it seems evident that the moving sands, and their adjuncts, of the "Beaufort's Dyke," off the Mull of Galloway, must, more or less, have a connexion with the northern Hinge-line, where there is the least rise of tide and the greatest current. This, however, is a subject that should be worked out by the adventurers who propose the formation of a tunnel from Ireland to Scotland.

¹ No perceptible tidal currents occur in a line from Dundrum Bay to Dalby, Isle of Man, and from Douglas, eastward, to Duddon.

Haughton's definition of the "Head of the tide," is not quite correct. It ought to be—*no surface current*. It is evident, as the water comes in, and subsequently goes out below, there must be considerable deep-seated currents—as indeed is evidently proved in the estuary of the Mersey, the currents there being adjuncts of the great "Head of the tide" in the neighbourhood of the Isle of Man. On chart No. 45, a considerable "race" is marked round the Bill of the Mull, also in the south portion of the "Beaufort's Dyke."

It is allowable to speculate as to the reasons why the gulch has in it shifting sands and their adjuncts. It is known that, on account of the rotation of the earth, the rise of the tides on the British side of the channel is greater than on the Irish side; therefore, at the northern Hinge-line, the denudation, due to the deep-sea currents, ought to be greater on the British side than on the Irish side—this seems to be the case, by the records on the different charts. If this is allowed, there ought to be, at this Hinge-line, the greatest currents, in and out, at high-water of spring tides, in the vicinity of the eastern coast-line—that is, off the shore of the Mull of Galloway; and these tidal currents should, during the ebb of the springs, carry the sands and their adjuncts in the gulch northward, and, during the flow, southward—each carriage, either northward or southward, being more or less augmented by favourable wind-waves. Thus, if there were continuous winds from the southward, the sands, etc., should accumulate towards the north of the gulch—the northward carriage being at a maximum; while, if there were continuous winds from the northward, to augment the flow tidal currents, the southern portion of the gulch should be more or less filled up.

These changes in the carrying powers of the currents would fully account for "the Fulls" being sometimes to the southward, and at other times to the northward, in the gulch; but there is still an anomaly in the deep that, according to the charts, seems always to exist south-west of the Bill of the Mull. This deep sometimes is gradually connected with the other deeps in the gulch, but often it is separated from them by an accumulation. How, therefore, is this accumulation to be accounted for? It may be suggested that, at the turn of the tide, the pent-up water in the "Head of the tide," rushes into the south end of the gulch, and cleans it out. This, however, will not account for the formation of the intercepting accumulations. This, possibly, may be due to the driftage southward due to the flow tide, augmented by the wind-waves not being

continuously long enough to carry the sands, etc., to the south end of the gulch; they therefore were stopped or even driven backward by the ebb tide current, thus forming an accumulation between the southern deep and the deeps in the other portion of the gulch.

All these suggestions are necessarily extremely speculative, as the charts are valueless for reliable conclusions, as we do not know under what conditions the soundings were made—the winds and state of the tide being most important consideration,—a continuous wind, either from the northward or southward, during the survey, would materially affect its correctness. To form correct conclusions from any of the charts, it would be necessary to have also a concise record of the conditions that existed during the time occupied in the Survey.

NOTES ADDED IN PRESS.

The rule of the Admiralty is: all charts should be corrected up to the date of last survey, and all prior charts should be cancelled and withdrawn from sale. I have an old copy of the chart of the British Isles, 1867, but no copies can now be bought of the charts of 1879, 1885, 1890, and 1894. I sent a copy of No. 45 (date of last survey, July, 1897); since then there have been most elaborate surveys—in December, 1897; in May, 1898; in July, 1898; in September, 1898; and, in November, 1898,—the result of these latter surveys being Sheet I., Irish Channel—previously Sheet 1825 A. The principal re-surveys were in August, 1872, and July, 1888.

A remarkable difference between chart 45 (1897), and Sheet I., Irish Channel, is: on the first, the "Race," at the Bill of the Mull, is made to run west and north-west; while, on the latter, it is recorded as running into Luce Bay.

What are drifting sands, off the coast of Wexford, Wicklow, and Dublin, composed of? Blocks, sometimes of large dimensions (see previous Papers, accounting for how they came there): gravel (coarse sand), shells (shell-sand), mud (fine sand), ooze (typical mud)—all things that are adjuncts of drifting sands, except the large blocks, will be found in the "Beaufort's Dyke," on chart No. I., of the Irish Channel.

“Drifting sands” is the universal general term for such accumulations as are found in the shifting sands off the south-east Irish coast. (See the old and the new editions of the “Pilot Directions”.)

There seem now to be only three Sheets for sale that show the “Beaufort’s Dyke” so named:—East Ireland, Sheet 45 ; Chart No. I., Irish Channel ; and, the General Chart of the British Isles. Sheet 45 is to be cancelled when corrected up to date.

V.

THE EARLIEST PERIODICAL JOURNALS PUBLISHED IN
DUBLIN. BY E. R. M'CLINTOCK DIX.

[PLATES VI., VII.]

[COMMUNICATED BY COUNT PLUNKETT.]

[Read FEBRUARY 27, 1900.]

ACCORDING to the accounts given by both Andrews in his "History of British Journalism" and by Dr. Madden in his "History of Irish Periodical Literature," the predecessors of the modern newspaper were pamphlets which first appeared irregularly, and with various titles or headings.

In England, the first regular appearance of such pamphlets, that is at fixed dates, occurred about the year 1621 or 1622, one of the earliest being entitled "The Weekly Newes." Others like it followed, and soon took hold upon their readers, and became the channels for conveying both home and foreign news, especially during the Cromwellian period. Such pamphlets subsequently were often called "Mercury" or "Mercurius," some adjective being attached to it to indicate its character. Then the term "Intelligencer" was used, or "Intelligence." Later on the appellation "News Letter" was given to them. At this period they did not appear more than two or three times a week; many only once a-week.

For many years it was supposed that the earliest appearance of such "News Letters" in Dublin took place about the year 1700; and for a time "Pue's Occurrences" was credited with being the earliest published paper or journal; but the late Sir John Thomas Gilbert in his "History of the City of Dublin" showed that, as early as 1682, the "Dublin Newsletter," published by Robert Thornton, was entitled to the priority hitherto assigned to "Pue's Occurrences." Sir John T. Gilbert's "History of Dublin" was published in 1861; and no second edition has appeared. His unexpected death prevented such a re-issue in his lifetime; and, as his researches were ceaseless, it is possible that he came across still earlier forms of the "News-Letter"; but, as far as I am aware, he has published nothing on the subject.

It was, therefore, with considerable interest that I lately received some particulars of the existence in the Library of Worcester College, Oxford, of pamphlets which, on closer examination (for which I am indebted to the kindness of Mr. Pottinger the librarian), have proved to be early weekly journals, printed and published here in Dublin, at dates ranging from 18 to 23 years earlier than Thornton's "Dublin News-Letter."

The earliest of these Worcester College pamphlets bears the following title :—

"AN ACCOUNT OF THE CHIEF OCCURENCES OF IRELAND, TOGETHER
WITH SOME PARTICULARS FROM ENGLAND.

From Monday, 12th March, to Monday, the 19th March."

It is a quarto tract, containing only eight pages, printed here by William Bladen in 1659. Bladen was the well-known King's printer in the latter part of the reign of Charles I., and subsequently filled a like post under Cromwell. This particular pamphlet, though not, in fact, so numbered, is evidently the fifth of a series, because its pagination is only "33" to "40," and the signature simply E in fours. It contains an account of the Irish Convention and a list of the members of the Convention. It has also news from England. There are, however, no advertisements in it. It will thus be seen that there was published here weekly, for a brief time at least, a journal, not only of local affairs, but with English news. In an elementary form, therefore, this little pamphlet constituted the earliest known form, the infancy, in fact, of the Dublin press. A reproduction of this unique number is, I think, a desideratum.

The second is a more interesting journal. There are fifteen consecutive numbers of it extant in the same library (Worcester College). We also find that this weekly journal has assumed a more concrete name. It is called, "*Mercurius Hibernicus*," or "*Ireland's Intelligencer*," "concerning transactions both domestic and foreign." This time we find each weekly issue duly numbered. No. 1 was for the week commencing "from Tuesday, January 13, to Tuesday, January 20," 1663, that is nearly four years later than "Bladen's Journal."

At this time Charles II. had been restored to the Throne for about three years, and Bladen was no longer printer. In fact no printer's name is given; but it is stated that this journal was "Printed for Samuel Dancer at the signe of the Horse Shooe in Castle-street, 1663."

It is further stated that it was "Published with License, according to Order."¹ Dancer was a well-known publisher and bookseller in Dublin at that time.

The copy of No. 1 in the Worcester College Library is imperfect, for two leaves are missing. It had originally eight pages, but the succeeding numbers, down to number 15, contain each four leaves or eight pages, the signatures following consecutively from A to P; but the pagination, while generally continuous, is sometimes incorrect.

The date 1663 was according to the new style; but whether the publisher had an affection for the old style, or had not the courage singly to adopt the new style, in advance of his generation, or for some other reason, he returned to the old style, 1662, from number 2 to number 9. Then number 10 has 1662 on its front page, while the imprint on the last is 1663, the succeeding numbers following that date. In number 3, Dancer is described as a bookseller; and in some of the later numbers his shop is given as "next door to the sign of the Bear and Ragged Staffe in Castle-street." The numbers of this journal contained not only local, that is Irish news, but also English and foreign news. Advertisements also appear for the first time. There is thus a distinct advance in the native press, and a much nearer approach to the fully developed newspapers of later years.

Dr. Madden, in his "History of Early Irish Periodicals," makes no mention whatever of this work, nor have I, so far, found any copy extant in any other library. The collection of tracts in the Worcester College Library is a very good one; and I am told that they are arranged and catalogued with special care. One cannot but regret that such treasures of our city should now be absent from it, and only to be found at so great a distance. The connexion between the Universities of Oxford and Cambridge and this country has existed for centuries; and hence their libraries are often enriched with copies of our books, pamphlets, etc., which are not to be found over here. Too little regard was had in past times for such literary curiosities and treasures.

It is, I think, of considerable interest to know that in Dublin there was a curious and reading public, who cared, even though but once a-week, to learn of the occurrences and transactions in other parts of their country, and also in England and abroad, at this early period.

¹ There can be no doubt, however, that the printer was John Crook, who succeeded Bladen, as the King's Printer, in 1661, and printed here down to 1668.

VI.

THE MILESIAN COLONIZATION CONSIDERED IN RELATION TO GOLD-MINING. By J. P. O'REILLY, C.E.

[Read JANUARY 22, 1900.]

IF one considers attentively, not only what is actually taking place in South Africa, but also what has been taking place there, in W. Australia, in N.-Western America, and in the Caucasus, in connexion with mining, during the last ten or fifteen years, it may fairly be asserted that during the latter half of the nineteenth century, mining enterprise has influenced the social and political development of the world, to an extent probably greater than at any former period of its history. Looking back to the discovery of gold in California in 1847, one can follow the onward rapid course of all the industries and sciences connected with mining or bearing on it, and note the impulse given to commerce, and to emigration from the old world, by the successive developments of gold fields in America, in Australia, and in Africa, with the consequent rapid increase in the modes of conveyance and the means of communication between Europe and the most remote parts of the globe. Going back to the commencement of the sixteenth century and the discovery of America by Columbus, the beginning of another period of intense mining activity may be noted, giving rise to an enormous production of precious metals, mainly in S. America, to the active exploration of the Continent, and to emigrations from Spain, and colonizations of these newly-discovered countries, having for general result profound changes in the social state of European countries and in the balance of power of the nations of Europe.

Were we to go back still further we should have to follow the development of the Roman Empire and note the activity with which the useful and precious metals required for its magnificent works and vast expenditures, were sought out, and worked in the interest of the Imperial Government. Going still farther back we come upon the traces of the Carthaginians, and Phœnicians, and Egyptians; the former so active and skilful in their colonizations, in their mining and trading enterprises; and we are able to observe how profoundly they were influenced by the more or less abundance of gold and silver,

copper and tin in the countries with which they had intercourse. And if it be not possible to trace back in history, similar periods of great mining activity in still more remote times, it is rather through the want of historic records, than through the absence of any such activity in prehistoric ages, since the testimony of the very oldest monuments points to the general knowledge of the precious metals, as far back as the monumental history of man extends, and to the existence at these remote periods of centres of mining enterprise, having for their object the production of these metals.

Hence, while fully recognizing how various were the causes which gave rise to movements of peoples in the past, it is not unreasonable to see in some of them a certain element of mining enterprise, having for object the acquirement of mining districts and the working of the useful minerals or ores they might present; and in order to secure that end, the obtaining command of the countries where they were presumed or were known to exist, and as well as of the routes of communication, with and from them, to the nearest and most advantageous markets. If, moreover, we read of colonizations or emigrations from countries where already great mining activity had become developed, and where men's energies had thereby acquired that stimulus for adventure which the industry of mining tends to give rise to, it is reasonable to suppose that such colonization or emigration had for object, amongst other things, the search for and acquirement of mining districts capable of furnishing a basis for the operations and industries of an active and intelligent community, possessed of a knowledge of the commerce of the useful metals and their accessories, and urged, as it might be, by competition or allured by a favourable opportunity of securing an advantageous field for its energies and powers.

These general considerations seem to me to arise from the reading of the traditional accounts furnished us of the early colonies which came to Ireland, more particularly that of the Milesians.

Taking the traditional history of this invasion or colonization as given in O'Kelly's translation of M'Geoghegan's "*History of Ireland* (1844, cap. III., pp. 46-55), it may be noted that from the very commencement, traditions are mentioned connecting this country with Spain. Thus there is given the tradition of the three Spanish fishermen who were driven by contrary winds on the coast of Ireland, "some time before the deluge." The tradition that one of the Firbolg princes, Eogha, married Tailta, "daughter of a Spanish prince," who gave name to the place of her burial, still called Taitin in Meath."

Speaking of the wanderings of the descendants of Fenias Farsa, King of Scythia, "from whom the Gadeliens and Milesians derived their origin," they are described as reaching Egypt under Nial, and in the third generation as being obliged to leave the country under the conduct of Sur, "and after a few days sailing" to have landed on the Island of Crete ("the cradle of the civilisation brought to Europe by the Phœnicians and Egyptians," the point of departure of the Tyrian Hercules for his expedition into Lybia and Iberia). Heber Scot, succeeding Sur in command, conducts the Gadeliens from Crete to the river Tanais in Scythia, "the country of their ancestors," "where his colony settled for some time" (the town of Tanais was a flourishing colony of the Milesians). A persecution, however, was raised through jealousy of the Scythians against them, and they were compelled to take refuge among the Amazons, having Adnoin for their chief. After sojourning there for some time, they departed under the conduct of Lamphion, son of Adnoin, for the country called in their language, "Goethluigne," supposed by O'Flaherty to be Gætulia in Africa. They remained in that country during eight generations under the command of eight chiefs, of whom the last was Bratha. "By Bratha they were led into Spain, inhabited at that time by the descendants of Tubal, son of Japhet (that is by a people skilled in metallurgy). These new comers under the command of Breogan, son of Bratha, made war with success against the old inhabitants, and became masters of the northern provinces, where Breogan built a city which he called Brigantia or Braganza, after his own name."

The narrative gives then the descent from Breogan, of Gallamb, otherwise Mileag Espain, in Latin Milesius, "the ancestor of the Milesians or ancient Irish," and after him they were called Clanna Mileag or Milesians. He became in his turn chief of the colony of the Gadeliens. His return to Scythia and adventures there are recounted, as also his subsequent departure therefrom. He embarked with his two children and little troop of faithful Gadeliens for Egypt. He there served Pharaoh as general, and married his daughter Scota, by whom he had two sons. "During his residence in that country he caused twelve young men of his suite to be instructed in the different arts and sciences then in use, in order that they might, on their return to Spain, instruct their countrymen in the same." Milesius, thinking it time to put an end to his labours and join once more his relatives and friends in Spain, after a residence of seven years in Egypt, took leave of the king and all his court to return with the princess, his wife, his children and attendants. The voyage to Spain and attendant

incidents are then mentioned :—"The family of Breogan, of which that of Milesius, king of Galicia, his grandson, formed the most considerate branch, was become numerous. A drought of several years, followed by a want of grain and of all kinds of provision having caused a famine, ruined and compelled them to seek a remedy for so pressing an evil. All the chiefs of the tribes assembled at Braganza to deliberate on what should be done. The result of the conference was to abandon their settlement in Spain and seek for one in some other country, particularly as Caicer, the Druid, a famous prophet among them, had foretold long before that their descendants should be possessed of the most westerly island in Europe." But as it was of importance to learn where that island lay before they should bring the whole of the colony thither, the assembly entrusted the discovery of it to *Ihy*, otherwise *Ith*, son of Breogan, and uncle of Milesius, a man of prudence and consummate experience. *Ith*, having accepted the commission, equipped a vessel, and taking 150 soldiers on board, besides rowers and sailors, he set out with Lugath, his son, to make the discovery to which he had been appointed. On his arrival in the north of the island he offered sacrifices to Neptune and inquired from the inhabitants what was the name of the country, and other particulars.

It is quite true that in this narrative there is no mention whatever of mining or metals, nor indeed of the occupations or mode of living of these adventurers, and yet they must have followed some calling or occupation which would have ensured them a means of living and travelling. Judging, however, from the extent of their wanderings, by the fact of these being mainly by sea, and lastly that they reached the north-western point of Spain, the circumstances are taken as pointing to their having been a body or tribe of adventurers, such as then existed, ready for war and capable of rendering service in maritime expeditions, either for commerce or for the piracies, so characteristic of the seafaring life of the period, and acquainted with the research and metallurgy of the precious metals. It would be easy to parallel their wanderings, from what is known of the travels of groups of mining explorers at the present time in search of gold or other profitable ore.

The determining reason assigned for their emigration from Spain is the extraordinary drought and consequent famine that then afflicted that country. The occurrence of this great and prolonged drought in Spain is mentioned by several Spanish historians, and the following is a translation of an extract relative thereto, taken from an old Spanish

work entitled "*Libro de las Grandezas de Tarragona*," by Micer Luys Pons de Ycart, printed at Lerida, 1572, p. 80. cap. x. :—

"Concerning the great drought of Spain and also of the first ruin of Tarragona, and of the peoples that thereafter penetrated into Spain. The first (destruction of Tarragona) happened at the time of this great drought, which lasted for a period of twenty-six years, during which no rain fell. In consequence the country became depopulated, since not only did the springs dry up but also the rivers, the wells, the trees, and the vegetation of the earth. This opened and became crevassed to an extreme degree; at the same time great winds reigned, so that the trees, already become dry, were, some broken, the others torn from the ground. And such was the extent of this great drought that in all Spain there was not to be found a green tree except on the borders of the Ebro and Guadalquivir, where were to be found some olive trees and pomegranates, since, as a matter of fact, these two rivers did not entirely dry up, having their sources in very cold mountain, according to the remark of Pedro Beuter in the first part of his '*Chronicle of Valencia*,' cap. vii., 'Concerning the drought which happened in Spain.' This author says that the event took place in the year 1250 (mcccl.) after the deluge (b.c., 1152)."

Pedro Medina, in his book on "*The Greatness of Spain*," cap. viii., says that "it happened 1332 (mccc. xxxii.) years after the great deluge, and b.c. 1070. Florian de Campo, in the second book of his *Chronicles*, cap. iv., says that it happened b.c. 1030. Although the historians differ as to the date of this event they are agreed on the fact of the occurrence of this great drought, of which also Diego de Valeca makes mention in the second part of his work, cap. v. It happened, therefore, in consequence of this great drought, that Spain became depopulated to such an extent that the inhabitants went away to inhabit the bordering or neighbouring provinces, where they remained until the bad time had passed. And according to some the poor people were saved and the rich perished, because the poor, not having wherewithall to live, emigrated the first and were thus saved, whilst the rich, having goods in store, lived on from day to day in the expectation that the times would become better, and so long did they tarry before leaving that when finally they wished to go also they were unable to do so for want of means of living, so that they perished on the highways for want of water, as also by reason of the difficulties presented by the ground, all crevassed and gasping as it was, in consequence of the great drought, and in this way the greater part of the rich and of the nobles of Spain perished, whilst the common people were saved,

having gone away in good time. Following on this drought it rained without interruption during three years, without cessation as it were, and a great many came to inhabit the country again."

"And Pedro Medina, in the cap. ix. of his work, gives a detail of the foreigners, who at different periods came into Spain, as also does Jarafa on p. 33 and *sq.* of his work. Florian de Campo, in the 2nd Book, cap. ii. and iii. of his work, and Alphonso de Cartagena, in his work entitled, '*Anacephaleosis Regum*,' cap. v., describes the arrival in Spain of the Lydians, the Thracians, the Rhodians, and Milesians, the Carians, and Lesbians, Phoceans, and many Greeks and Carthaginians."

A drought of the intensity and duration such as that referred to here, would imply great consequent social perturbations, not merely as regards Spain, but also as regards neighbouring countries, since the meteorological and physical causes to which such a drought could be attributed, must have affected more or less the countries which border the Mediterranean Sea, Gaul, Italy, Greece, Syria, Northern Africa, and the Islands of the Mediterranean. Hence, any history or record of those times which has come down to us, concerning the countries mentioned, should, if the drought really took place, to the extent described, acquaint us with great migrations and emigrations of tribes and peoples, from the waterless, and therefore famine-stricken, districts to the river valleys, which continued to carry water, and, therefore, to offer satisfactory conditions for life. The authority cited mentions in Spain, as such, the valleys of the Ebro and Guadalquivir, because of their sources being situated in snow-clad mountains; this condition would have characterised equally certain of the rivers of the northern part of Spain and Gaul, having their sources in the highest points of the Pyrenees. Hence it might be assumed, that the valleys of the Tagus, Deuro, and Minho, and those of the Asturias and Galicia would have afforded shelter and favourable conditions of life to emigrants from the central plateau. As these privileged districts became crowded, emigration would have carried away the later comers to other countries more favourably circumstanced, such as the Valley of the Rhône, or of the Nile so exceptionally favoured by nature, so that historical data from any other sources failing us for those early dates, it is to the records of Egypt that we should turn to look for some indications which might be taken as the consequences of this drought, if it really occurred about the period mentioned, that is, from about B.C. 1152, to about B.C. 1030. Citing from the article on Egypt "in the British Encyclopedia (1877)," we find the following dates

given for the commencements of the XIXth, XXth, XXIst, XXIIInd, Dynasties (the corresponding dates given by Brugsch being here added).

Century.	Mariette.	Lepsius.	Brugsch.
XIXth,	1462 B.C.	1443 B.C.	1400 B.C.
XXth,	1288 „	1269 „	1200 „
XXIst,	1110 „	1091 „	1100 „
XXIIInd,	980 „	961 „	966 „

At page 739 it is stated—"Before the death of Setee I. (*circ.* 1366, B.C.), the maritime nations of the Mediterranean made a descent on Egypt. The Shardanes or Sardones, and the Tuerscha or Tyrseni being allied with the Lybians in this enterprise."

Circ. 1333 B.C.—Ramses II. defeated them so effectually that they do not seem to have again attacked Egypt till the reign of his son Meneptah, about 70 years or more subsequently.

Circ. 1300 B.C.—Meneptah succeeded Ramses II.; there are but few monuments of his reign. The principal event that they date is a great incursion into the Delta of the maritime nations of the Mediterranean, allied with the Lybians. By this time the Pelasgic tribes had wrested the dominion of the sea from the Phœnicians. "*Some cause, perhaps famines, had already disposed them to move from Asia Minor and the Greek Islands, seeking new settlements in Egypt.*" The attempt that Ramses II. defeated in the lifetime of Seti I. was now renewed, apparently on a more formidable scale. They had already entered Egypt and spread themselves over the W. of the Delta where they intended to settle, when the Egyptian forces attacked them and put them to rout after a battle of six hours' duration.

Citing from Brugsch's "Under the Pharaohs" (1891), p. 243, it is stated, "The Wars of Seti (*circ.* B.C. 1366), arose from the constant advance of neighbouring peoples upon the Delta, p. 249. Seti carried his wars to the W.; in particular against the Lybian tribes, *who now appear for the first time in the Egyptian monuments.* The double plume on the crown of the head, and the side locks of hair, mark in the most striking manner these races, which the inscriptions designate

by the name of 'Thuhi,' 'Thuhen,' or 'Thuheni,' i.e., 'the light or fair people.'"

Page 255.—"The abundant tribute and taxes which under Thuti-mes III. were yearly contributed by the conquered nations, and his own subjects, seem from the reign of Seti to have flowed in less vigorously, whilst the wants of the kings were the same, and the erection of costly buildings required a certain expenditure. New sources must needs therefore be opened for the required means. So the king began to devote special care to the regular working of the gold mines in Egypt and Nubia, and to the formation of wells in the midst of the parched mountain regions, from which the gold was to be won. Therefore, everything was done to carry on the gold washings with success. The people who followed this laborious occupation were placed under the superintendence of a 'her-pit' or 'overseer of the foreign people.'"

Page 258.—Chap. XII., XIX., Dynasty, Ramses II., *circ.* B.C. 1333. This is the king who above all others bears the name of A-nektu, or "the Conqueror," and whom the monuments and papyri often designate by his popular names of *Ses*, *Sestesu*, *Sotesu*, or *Sesura*, that is the Sesthosis, who is called Ramesses by Manetho; the Sesostris of the Greeks.

Page 262.—An inscription of his says, "I dedicate to thee, ships with their freight on the great sea, which should bring to thee (the wonderful productions) of the holy land." "The merchants carry on their commerce with their wares, and their productions of gold, and silver, and bronze."

Page 264.—In the 5th year of the king's reign a great war broke out between Egypt and "*peoples from the extreme end of the sea to the land of the Keta*" (*circ.* B.C. 1328).

Page 287.—In order to increase his revenues, Ramses turned his attention to the gold districts, and especially to the Nubian mines of Akita, the modern Wady-Ollaqui.

Page 292.—So early as the XIth Dynasty, we find traces of borings for water in the waste valleys of Hammamât, 1200 years before the accession of Ramses II. Sank-ka-Ra, one of his ancestors, had made four wells on the old road from Coptos to Kossir, the remains of which are still to be seen.

Page 307.—Ramses reigned 67 years, p. 309; his fourteenth son, named Menepthah, was his successor.

Page 311.—Menepthah II. commences his reign (*circ.* B.C. 1266).

Page 313.—The inscription of this king as to the advance of the

foreigners into the Delta, says, "They have already advanced into the fields of Egypt, from the boundary of the river onwards. They have gained a firm footing, and spent days and months therein. [They have] settled themselves [near the towns]. It was a privilege ever since the kings of upper Egypt, on the grounds of the historical records of other times. But no one knows [that they ever came in large numbers] like vermin. They have come to *Egypt to seek sustenance for their mouths.*"

Page 314.—"Then the mercenaries of his Majesty took what he had left of his property, his money which he had gathered in, *his silver, his gold, his vessels of iron.*"

Page 315.—Thou wilt be the man who will undertake it, by giving orders to kill [the rebels among the inhabitants] in the land of the Tamahu [of the Libu].

Circ. B.C. 1261. "Such was the great battle of Prosopis, which took place in the 5th year of the reign of Meneptah. With the Lybians, who were held in contempt by the Egyptians as uncircumcised, were joined mercenary troops of the *Caucaso-Colchian race, who in these times had migrated into their country and rendered military service, partly in Egypt and partly in Lybia.*"

Page 316.—The whole coast beyond, as far as Cyrene, appears to have been a gathering ground of *warlike adventurers of the Colchian-Cretan tribes*, up to the Dardani, whose name is again reflected in the Greek designation of the town Dardanis.

Page 321.—User-Kha-Ra-Solep-en-Ra = Set-nekht (*circ. B.C. 1233*). All that we are able to say of him can be condensed into a few words: he was the father of a great king, and he lived in times full of disturbance and trouble.

Page 322.—Nor was it only against native claimants of the throne that this prince had to wage war, foreigners also contributed to turn Egypt upside down. The people of Egypt lived in banishment abroad. "The land of Egypt belonged to princes from foreign parts. They slew one another, whether noble or mean. Other times came afterwards during years of scarcity."

Page 325.—XXth Dynasty, Ramessu-Haq-on = Ramses III. (*circ. B.C. 1200*). The miserable state of Egypt before his accession could not be better described than in his own words, cited in the last chapter. He was next occupied with wars against foreign nations.

Page 326.—Nations who had invaded the borders of Egypt. A war was next kindled by the Lybians and Maxyes, who, as before, under Meneptah II., made an inroad into the Delta, and occupied the whole

country along the left bank of the Canopic Branch of the Nile, from Memphis, as far as Carhana (Canopus).

Page 327.—No less important was the despatch of a mission by land to the copper mines of Aketa; “and the metal shining like gold, and in the form of bricks, was brought from the smelting-houses in those parts.”

Ramses III. *must have enjoyed enormous wealth*, which he lavished on the temples of Amon, Ptah, and Ra, of Heliopolis. When he came to the throne, things looked bad for Egypt. “The hostile Asiatics and Tuhennu robbers (the Lybian Marmaridæ) showed themselves only to injure the state of Egypt.”

Page 329.—In the 5th year of his reign, the enemies prepared a fresh attack from the west (*circ.* B.C. 1195). “The people of the Tamashu assembled together in one place; the tribe of the Maxyes prepared themselves for a raid out of their own country.” (The Maxyes were a Lybian tribe, and a branch of the nomad Ausenses.) Herodotus places them on the left bank (the western) of the river Triton; reclaimed from nomad life, they were tillers of the earth, and accustomed to live in houses. They still, however, retained some relics of their former customs, as “they suffer the hair on the right side of their head to grow, but shave the left; they painted their bodies with red lead”; remains of this custom of wearing the hair are still preserved among the “Tuaregs,” their modern descendants.—(Smith’s “Dict. of An. Geo.,” vol. ii., p. 299). The defeat of the enemy was tremendous. Three years after this event, a warlike movement broke out in the north, *caused by the migration of the Carian and Colchian tribes*. “They (the invaders) came up, leaping from their coasts and islands, and spread themselves all at once over the lands.”

In the 11th year of Rhampsinitus, a new struggle threatened the safety of the country from the west.

Summing up those citations from the Egyptian inscriptions and history, as regards dates, we find:—

Circ. B.C. 1366. Descent of the maritime nations of the Mediterranean into Egypt, “*from the extremest end of the sea, to the land of the Keta*”—defeated by Ramses II.

Circ. B.C. 1330. Great incursion of the maritime nations of the Mediterranean into the Delta, in alliance with the Lybians, under Menepthah. “*Some causes, perhaps famines, had already disposed them to move from Asia Minor and the Greek Islands.*”

Circ. B.C. 1295 (under Menepthah II.). Further invasion of the Delta by the maritime nations of the Mediterranean. Battle of

Prosopis and defeat of the invaders in the 5th year of the reign of Menepthah II.

Circ. B.C. 1266. Menepthah II. repels the invasion of the foreigners, who had come into Egypt "*to seek sustenance for their mouths.*"

Circ. B.C. 1233. Set-nekht, lived in times of disturbance and troubles—troubles in Egypt caused by foreigners. "The land of Egypt belonged to princes from foreign parts."

Circ. B.C. 1200. Ramessu-Haq.-On = Ramses III., occupied with wars against foreign nations who had invaded the borders of Egypt.

It would thus appear that from about B.C. 1360 (Seti I.), to the end of the reign of Ramses III. (*circ.* B.C. 1166), repeated invasions of the Delta took place by the maritime nations of the Mediterranean and their allies, consequent on famine, at least in one case (Menepthah II.), and foreigners established themselves therein, almost to the exclusion of the Egyptians. As regards the nations and tribes mentioned in the inscriptions as having come from the extreme western shores of the Mediterranean, certain of these may have been from the Spanish side, even from the basins of the rivers which had been dried up; possibly from the western coast of Spain. The Egyptian records of the period mentioned support, therefore, to some extent the traditions relative to the occurrence of great and prolonged drought in Spain having caused an immense emigration from that country to others not so affected, such as the Valley of the Nile; the date of that event may have been as late as 1156 B.C. (Pedro Beuter), but the probability is, that it took place somewhere in or about the twelfth century B.C. Considerations of another order would lead to the acceptance of this date for the Spanish drought and consequent famine and emigrations (bearing in mind that the causes of the drought operated over a much wider extent of land than Spain alone). Thus the dates relative to the Etruscan emigration would seem to bear upon this point, and are, consequently, worthy of citation. In the article on "*Etruria*" ("Br. Encyclopædia," 1878) it is stated, p. 637—"Next to years they counted by *sæcula*, each representing the longest life of the time, and reaching in some cases to 123 years; but with an average apparently of 100. The Etrurian nation was to endure ten *sæculæ*. The beginning of the tenth was enounced in the year 44 B.C., p. 639. It appears from a statement of Varro, quoted by Censorius (*De Die Natali* XVII., 5 fol.), that Etruscan history was divided into ten periods, or *sæculæ*; and it is known otherwise that the tenth of these began in the year 44 B.C. The four first *sæcula* are given as having lasted each 100 years; the fifth, 123 years; the sixth, 119 years; and, allowing for the eighth

and ninth each an average of 120, we obtain the year 1044 B.C. as the beginning of Etruscan chronology—a date which curiously corresponds with that usually assigned to those great movements of races in Greece with which the Etruscan traditions were associated. The really important point, however, in these figures, as Helbig (*'Annali dell. Instit. Arch.,'* 1876, p. 230) has lately shown, is the circumstance that the first four periods are given in round numbers, and thus justify the inference that the keeping of regular records had not begun until the fifth period, commencing B.C. 644."

On the other hand, in Burton's "*Etruscan Bologna*" (London, 1876), p. 173, the author says:—"They (the Etruscans) are generally believed to have first founded the Tyrrhenian Federation of the west, '*Etruria Madre*,' and to have crossed the Apennines, and occupied the circumpadan regions, '*Etruria nova*,' as far as the Alps (Herod. Clio. 94), and lastly, '*Etruria Campania*,' or Orpicia, in the twelfth, or perhaps the thirteenth, century B.C. This would be about the date of the Trojan War (popularly B.C. 1184) (Note)—Niebuhr (I. 138), also carries back the first Etruscan Sæculum to B.C. 1188, or 434 years A.U.C."

The citations already given from Egyptian history and inscriptions, not merely afford evidence of invasions by foreign tribes and people under the pressure of famine, which in the latitudes of the Mediterranean would mainly result from severe droughts (as in India at present), but also furnish proofs of the activity and extent of the commercial navigation of the times considered, thus Ramses II. says in an inscription:—

"I dedicate to thee, ships with their freight on the great sea,"
 "The merchants carry on their commerce with their wares, and their productions of gold and silver and bronze."

They further furnish proofs of the great stimulus given by the vast enterprises of the Pharaohs, to the quest and production of the precious metals, and of copper and iron. They show us how the mining works were conducted under the superintendence of a "*her-pit*," or "overseer of the foreign people." Lastly, they show us that the Delta and its ports were the great emporiums for the commerce of east and west, and that bands of adventurers settled in the Delta coming from Colchis, from the Caucasus and from Crete, and suggest to a certain point a parallel between them and the Milesian colony, who are mentioned as starting from the district of the Tanaïs in Scythia as having been in Crete, as having served in Egypt, and as having spent some time in Gætulia (?) and with the Amazons.

Assuming for the moment that these inhabited the present western part of Marocco (as has been argued), it is to be noted that remains of cities, and of mining works of a very high antiquity are mentioned as existing there, and as awaiting the researches of archæologists. In so far as the expeditions of the Milesians took place by sea, they involved the use of shipping; and it is reasonable, if not necessary, to admit that they were effected by means of the commercial vessels of the period, whose commanders had a knowledge of the navigation of the coasts and ports, to which the emigrants wished to go, or could be advantageously transported to. Now it seems admitted, that while the Pelasgians, the Rhodians, and the Tyrrhenians disputed with the Phœnicians the maritime supremacy of the Mediterranean, it was otherwise as regards the coasts of Spain, outside the pillars of Hercules. There the Phœnicians reigned supreme, so far as is known to us, and hence it may be inferred that the expedition of the Milesians into Spain was in some way connected with the trading enterprise of the Phœnicians. Hence, it is of interest to show to what extent they dominated as navigators and merchants. Now, in the excellent article on "Phœnicia," in "Chambers' Encyclopedia" (1865), it is stated:—

"In the space of three centuries (1300 to 1000 B.C.) the Phœnicians had covered all the islands and coasts of the Mediterranean with their forts, their factories, and their cities; and their ships, which ploughed the main in all directions everywhere, found their own ports. To the east of the Ægean, we find them at Erythroe, and further, as masters of the islands of Samothrace, Lemnos, and Thasos, with its wealth of goldmines. From Sardinia and Minorca the indefatigable mariners went still further west, through the Straits of Gibraltar to Tarshish (the California of those days) or Spain, where they founded Gaddir or Cadiz; and in the south, Karteja, Malaka, and Abdarah. From here, having colonized well nigh the whole of the Spanish coast, they went northwards to the Tin Islands (Scilly Islands), and to Britain herself. The impulse given to industry and the arts by this almost unparalleled extension of their commercial sphere was enormous. The wealth of silver, iron, tin, and lead was chiefly got from Tartessus. The description of the abundance of precious metals there verges on the fabulous. Their mining operations in the Lebanon and Cyprus, where they dug for copper; in Thasos, where, according to Herodotus, they overturned a whole mountain in search of gold, but more particularly in Iberia, where at first silver was so abundant, that hardly any labour was required to obtain it, were stupendous;

and the minute description of the mining process contained in Job (cap. xxviii., 1-11) has probably been derived from a sight of Phœnician mining works. Their architecture seems to have been of a cyclopean character." In the article "Ship,"¹ it is stated:—"The Phœnicians, at an early date, constructed merchant vessels capable of carrying cargoes, and of traversing the length and breadth of the Mediterranean, perhaps even of trading to the far Cassiterides, and of the circumnavigating Africa."

In the article from "Chambers' Encyclopedia," already cited, it is stated:—"The internal arrangement of their vessels was perfect, and excited the wonder and admiration of the Greeks, by their being so splendidly adapted at once for navigation, freight, and defence."

In the article on "Phœnicia,"² it is said:—"The beginnings of navigation lie beyond all human memory, but it is not hard to understand how the ancients made this also an invention of the Phœnicians, whose skill as seamen was never matched by any ancient people, before or after them. Even in later times, Greek observers noted with admiration the exact order kept on board Phœnician ships, the skill with which every corner of space was utilized, the careful disposition of the cargo, the vigilance of the steersmen and their mates.³ They steered by the polar star, which the Greeks, therefore, called the Phœnician star, and all their vessels from the common round 'gaulos' (or galley) to the great Tarshish ships of the ancient world had a speed which the Greeks never rivalled. It was they, in fact, who from the earliest times, distributed to the rest of the world the wares of Egypt and Babylon.⁴ The great centre of Phœnician colonization was the western half of the Mediterranean, and the Atlantic coasts to the right and left of the straits. In especial the trade with Tarshish, that is the region of the Tartessus (Guadalquivir), was what made the commercial greatness of the Phœnicians. Next the Phœnicians ventured further on the ocean, and drew tin from the mines of north-west Spain, or the richer deposits of Cornwall. The rich trade with Spain led to the colonization of the west. The trading connexions of the Phœnicians reached far beyond their most remote colonies."

Rawlinson in his "Phœnicia" (1890) states, p. 9:—"From a date which cannot be placed later than the twelfth century B.C., the carrying trade of the world belonged mainly to Phœnicia, which communicated by land with the Persian Gulf, the Euphrates, Armenia,

¹ "Encyclop. Br." (1886), p. 806.

³ Xen. *Æc.* viii. 11 & sq.

² *Ibid.* (1885).

⁴ "Herodotus, *ib.*"

Cappadocia, and Anatolia, and by sea with Egypt, Greece, Italy, North Africa, Gaul, and Spain."

Page 22.—"It is at any rate certain that for a thousand years, from the fourteenth century to the fourth century B.C., a great and remarkable nation, separate from all others, with striking and peculiar characteristics, occupied the region in question, drew upon itself the eyes of the whole civilized world, and played a most important part in history; while almost the whole world made acquaintance with its hardy mariners, who explored almost all seas, visited almost all shores—the people who first discovered the British Isles, and made them known to mankind at large; the people who circumnavigated Africa, and caused the gold of Ophir to flow into the coffers of Solomon."

The wanderings of the Milesians in the Mediterranean prior to their arrival in North Western Spain, may indeed have been effected by the aid of any one of the maritime nations of that sea; but their coming into Spain, and more particularly their settlement in the N.W. corner of that country, would, from the citations made, almost imply the intervention of the Phœnicians, since the trade and navigation outside the Straits is stated to have been entirely in their hands, more particularly as regards the precious metals. Hence it would not be unreasonable to consider the Milesian adventurers as working in conjunction with the Phœnician merchants and navigators, acting as colonists or explorers, and able to turn to advantage mining discoveries. It must at an early date have become known to the Phœnicians through their trade communications along the W. coast of the Peninsula, that the Tagus carried gold in its sands, and probably Lisbon, as it then existed, was a trading station for them in that respect. In the same manner, they would have become acquainted with the fact of the Deuro, also being auriferous, and would have explored the valley of the Minho, and more particularly its upper waters, the Sil and all its embranchments, and thus would have acquired a knowledge of the remarkable gold district of the Sil. Now it was at the gates, one might say, of this auriferous country, almost the only one in Spain, that the Milesian Colony is described as having been settled, after a contest with the natives. Bearing in mind that this part of the Peninsula was then inhabited by Celtic tribes, as also the experience the Phœnicians had acquired in the working of the gold mines of Thasos, and their noted intelligence as miners, it is easy to conceive that an opportunity was presented to them of establishing productive gold washings in the district in question. The ore was

abundant, there was plenty of water for its treatment, with abundance of timber, and most favourable climatic conditions.

In Lardner's Cabinet Cyclopaedia "History of Spain and Portugal," vol. i., the following statements are made which bear on this subject:—

Page 7.—"There is reason to believe that the Celtiberian nations were not unacquainted with commerce, even before the invasion of the Phœnicians. But their trade was confined to the coast. From this period (the arrival of the Phœnicians) the riches of Spain were almost proverbial, coins and medals of ancient date, some representing the religious rites, or ordinary pursuits of the people, others covered with Phœnician characters, are frequently dug up. But iron was the mineral for which the country was most renowned. When turned into steel, the excellence of the workmanship made foreigners anxious to obtain them (*i.e.* the Celtiberian weapons)."

Page 15.—"The Callaici, or Gallicians, possessed the sea coast between the Asturias and Lusitania. From the most ancient times, as at present, their maritime superiority over all other nations of Spain is beyond dispute. The abundance of fish on their coasts, and the fertility of their soil, attracted the Phœnician and Carthaginian merchants to their ports. Besides they had numerous mines of the precious metals and tin. Gold, we are told, was so common, that the labourers in the field frequently dug up ingots several ounces in weight. This is exaggerated, but there can be no doubt that the mines were highly productive."

Page 16.—"Respecting the Turdetani, Strabo has some precious information. He says that they were the most learned tribe of all Spain, that they had reduced their language to grammatical rules, that for 6000 years they had possessed metrical poems, and even laws (Strabo, lib. iii.). The Turdetani seem to have inhabited a portion of Lusitania as well as Bœtica."

Page 21.—"The precise period of their (the Phœnicians) entering into relations with the inhabitants is unknown; doubtless it was before the foundation of either Carthage or Rome." Note on this:—"Madsen (a Spanish historian, 1740-1817), gives the chronology, very satisfactory for himself" thus:—

In the	XXth	century	B.C.,	The Phœnicians	ventured as far as
				Egypt.	
"	XIXth	"	"	They visited	Argos.
"	XVIIth	"	"	They had good	ports and arsenals.
"	XVth	"	"	They first appeared	on the coast of
				Spain.	

In the	XVth century	B.C.,	The Phœnicians colonized Cadiz.
„	XIIth	„ „	They constructed the famous fleet which aided Semiramis in the invasion of India.
„	XIth	„ „	They taught navigation to the Jews.
„	VIIth	„ „	They sailed round the whole continent of Africa, from the Arabian Sea to the Cape of Good Hope, and thence to the pillars of Hercules.

“For some time, their settlements, of which Gades, now Cadiz, was the first and most powerful, were confined to the coast of Bœtica, whence they supply the natives with the traffic of Asia Minor, and the shores of the Mediterranean in exchange for the more valuable productions of the Peninsula, such as gold, silver, and iron. Coins, medals, and ruins, attesting their continued location, have been found in most provinces of Spain, and even at Pamplona in Navarre.”

Too much insistence cannot be made on the predominance of the Phœnicians as regards navigation, trade, and the arts, not only in the Mediterranean, but more particularly outside the Straits and along the W. coast of the Peninsula, during those early centuries. They were admittedly the great explorers, conveyors, and instructors of those times, and whatever they have left us of historical record cannot be too carefully sifted. As bearing, therefore, on the probable nature of the Milesian expedition, it is desirable to examine what is known of the colonies or cities which the Phœnicians are said to have founded, as regards their antiquity and the dates which have been, or may be assigned to them, taking for granted that they had acquired a knowledge of the trading advantages presented by the coast long before they actually founded their cities and ports. Cadiz is one of the most renowned of these, and in the article thereon in the Br. Encyclopædia (1976), it is stated:—“Cadiz, in Latin *Gades*, and formerly called ‘*Cales*’ by the English, is identical with the ancient Agadir, Gadir, or Gaddir (in Greek *Gadura*), which was a flourishing Phœnician colony, long before the beginning of the classical history. Some remains of the ancient city, and particularly of the Temple of Hercules, are said to be visible below the sea.”

The London Encyclopædia (1829) states as regards these remains: “The earthquake of 1755 caused the sea when it retired, to leave behind it wrecks which appeared to have belonged to a temple. A tradition that the ancient city of Cadiz was once swallowed up by au

earthquake appears thus to be confirmed. It is certain that the sea without the Straits of Gibraltar, has encroached on the land. It is said that in very calm weather when the tide is low, the ruins of the old houses and the remains of the Temple of Hercules may sometimes be discovered under the water."

Chambers' Encyclopædia (1888) says of it: "Cadiz, one of the most ancient towns in Europe, having been built by the Phœnicians under the name of Gaddir (= 'fortress') about 1100 B.C."

The excellent article in Smith's "Dictionary of Ancient Geography" says "it was the chief Phœnician colony outside the pillars of Hercules, having been established by them long before the beginning of classical history. To the Greeks and Romans it was long the westernmost point of the known world; and the island on which it stood (Isla de Leon) was identified with that of Erytheia, where King Geryon fed the oxen which were carried off by Hercules—or, according to some, Erytheia was near Gadeira."

Page 924.—"There are extant coins of the old Phœnician period as well as of the Roman city; the former are, with one exception, of copper, and generally bear the head of the Tyrian Hercules (Melcarth) on the reverse, one or two fishes, with a Phœnician epigraph in two lines, of which the upper has not been satisfactorily explained, while the lower consists of four letters which answer to the Hebrew characters for *Agadir* or *Hagadir*, that is the genuine Phœnician form of the city's name, with the prosthetic breathing or article, the omission of which gives *Gadir*, the form recognized by the Greek and Roman writers."

Professor George Rawlinson, in his "Phœnicia" (1890), ("Story of the Nations"), gives (page 66), after Kenrick, a vivid description of the wealth of the "wide plains through which the Guadalquiver flows." "Gold, silver, quicksilver, tin, lead, copper, and iron abound in the mountains in which the Boëtis (Guadalquiver) and its tributaries rise."

Page 67.—"The ocean tides which enter the mouths of these rivers (Guadalquiver and Guadiana) carried ships far up into the land." The sea was equally productive with the land in the materials for an extensive commerce. "In this delightful region (says Prof. Rawlinson), at a very early date, soon after the Trojan War, according to Strabo, the Phœnicians founded the colonies of Gadura or Gades, whose name survives in the modern Cadiz, of Malaca (now Málaga), of Abdera (now Adra), and of Carteia (perhaps Rocabillo). Of these by far the most important was Gadeira."

As regards the date of the Trojan War, the following may be cited from the article, "Trojan War" (Smith's "Cyclopædia of Names," 1894). Duris placed the fall of Troy in 1335 B.C.; the author of the "Life of Homer" in B.C. 1270; Herodotus in 1260 B.C.; Thucydides in B.C. 1260; the Parian Marbles in B.C. 1209; Eratosthenes in B.C. 1183; Sosibias in B.C. 1171; Ephorus in B.C. 1169; Clemens in B.C. 1149 (Rawlinson, Herod. ii. 223, note). According to Hayden's "Dictionary of Dates," Mr. Gladstone is cited as taking for the date of the war, B.C. 1316-1307, while the "popular" date, or that usually received is mentioned as B.C. 1183-84, for the fall of the city. Accepting Mr. Gladstone's date, as coming from a high classical authority, and as based on sound research, while allowing for the wide range of difference between the assigned dates, the founding or building of Cadiz may be taken as having occurred somewhere between 1200 and 1300 B.C., the place having, in all probability, for some time before that, been a factory or trading-station, and used for that purpose, as also for fishing by the native Celts. Starting with this, we may form some estimate as to the dates at which other colonies or cities were founded along the coast of Spain by the Phœnicians, and presuming that Cadiz was one of the earliest of these. Thus Lisbon, at the entrance of the Tagus, is said (according to the article in Chambers' Encyclopædia, 1864) "to have been founded by the Phœnicians." The Encyclopædia Britannica, 8th edition, says of it:—"The origin of Lisbon is lost in remote antiquity; but there are not wanting fables to carry back its foundation some thousands of years before the Christian era. Pliny states that its first inhabitants were a warlike tribe called '*Turduli*.' It passed successively into the hands of the Phœnicians, Greeks, Carthaginians, and Romans." Having regard to the great extent and excellence of the port, and the fact that it is the largest in Portugal, there is ground for admitting that it was already a place of importance when the Phœnicians first visited it, and traded there for its gold amongst other wares; since the sands of the Tagus have been worked from remote times for their gold, particularly at the entrance, on the strand now known as that of Saõ Juliaõ da Barra, the profit has, however, become so slight that the washing has completely ceased (Dict. de Geo. Univ. V. de St. Martin).

The Deuro or Duero has already been mentioned as carrying gold in its sands; and on its northern bank stands the city and port of Oporto (O'Porto).¹ "Small quantities of tin and quicksilver are extracted in the neighbourhood."

¹ "Encyclopædia Brit.," 8th edition, p. 519.

The edition of 1884 says of it:—"The history of Oporto dates from an early period. Before the Roman invasion, under the name of *Gaia* or *Cayo*, it was a town with a good trade."

The Edinburgh Encyclopedia (1830), says:—"To the westward, along the declivity of the hill, are a number of detached houses forming the market town of *Gaya*, a place remarkable both for its situation and name. Here in former times, a place called *Cale*, of which the ancients speak, is said to have stood, but Oporto being afterwards built, or being more convenient for ships, from the greater depth of the water along the bank, it was called *Portus Cale*, or the harbour of *Cale*, whence was derived *Portucál*, and at last *Portugal*; *Portus Cale* was at length called *O Porto* (the harbour), which name the town of Oporto afterwards received."

It may be remarked that the word "*Cale*" in French is thus explained in Littré and Beaujean's "*Dict. de la langue française*" (1883):—" *Cale*.—Fond ou partie la plus basse de l'intérieur d'un navire ('se cacher à fond de cale'). La partie inclinée d'un port pour le chargement d'un bateau. Plan incliné vers la mer servant à construire ou à réparer des bâtiments. Cale de constructioni."

In Littré, 1st edition (1863), gives as an example: "René escorté d'un détachement de soldats de marine, débarque à la cale du port" (Chateaubriand *Natch* II., 202). Anciennement Crique, abri, entre deux points de terre ou de rocher.

In O'Reilly's Dictionary (Irish-English, 1877) is given :

Cala, Calad		s.m. a port, harbour, haven, ferry, <i>inde Calais</i> .
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It would seem, therefore, that *Cale* as applied to Oporto anciently implied the existence there of a Celtic harbour, at the time of the arrival of the Phœnicians, and that the terms "*porto*" and "*cale*" were practically synonymous for harbour. The term "*Cale*" would to some extent imply that vessels were in the habit of being built there, that is, that it was a port of construction, having supplies of timber and iron, &c., necessary for that purpose.

As regards the name "*Gaia*" or "*Cayo*," it may be of interest to cite the etymology of the word "*quai*" (French) given by Littré in his dictionary:—"Bas-latin, *caium* = 'quai' dans une charte de Philippe Auguste; espagnol, *cayos* = 'ecueils'; portug., *caes* = 'quai'; hollandais, *kaai*; glose d'Isodore, *kai* = 'cancelli,' 'barreaux'; du celtique Kimry, *kae* = 'hau,' 'barrière'; bas-breton, *kaé* = 'haie et quay.' Les diverses significations, *caium*, *cayos*, and la glose d'Isodore se tiennent par un fil de significations, que l'on suit sans peine."

Is it not probable that the names *Caia* or *Gaya* are simply older forms of the word "Quai" or bas-latin *Caium*? and thus the three names Oporto, Cale, and Gaya stand in the same relation one to another as port, harbour, and quay in English actually. It would further thus appear that a Celtic harbour existed at the mouth of the Deuro before the arrival of the Phœnicians, and was the cause of their extending their commercial relations along the coast. The river Miño or Minho which separates the present Galicia from Portugal was the Minius of the Romans, and was said to have received its name from the "*Minium*" or "*Vermillion*" carried down by its waters, or according to other authorities, found in its bed (Justin xrv., 3). Minium is a red oxide of lead, and Vermillion the sulphuret of mercury, both of which are so heavy of themselves, that they could hardly remain in suspension in the water of a river such as the Minho, unless under very extraordinary conditions, both as regards the rate of flow of the river, and as regards the quantities of these bodies existing at the surface of the ground, or being produced by mining or metallurgical operations. It is very likely, therefore, that the red colour implied by the name arose from the presence of red oxyde of iron in a fine state of division, which does actually colour many river waters, especially during their periods of flood. In Irish *mian* signifies a "mine or ore," and the Minho would be thus explainable as the river "carrying the ore," and this would perfectly describe it as regards its upper waters, particularly the river Sil, which is really the Minho in its upper waters, and the basin of which is the gold region already referred to.

According to Niebuhr (cited by Ulick R. Burke in his "History of Spain," vol. i., p. 3), "the heights in the North of Spain whence the Tagus, Durius, and Minius flow towards the sea, and whence on the other side smaller rivers carry their waters towards the Ebro, were inhabited by Celts, who were also called *Celtiberians*, other Celts bearing the name of *Celtici*, dwelt in Algarbia and the Portuguese Estremadura, others again inhabited the province of Entre Douro e Minho, in the north of Portugal. These three Celtic nations were quite isolated in Spain. The Celtiberians were not pure Celts, but as their name indicates, a mixture of Celts and Iberians; but the Celts in Portugal are expressly stated to have been pure Celts (Niebuhr Lectures on "Ancient and Modern Geography and Ethnography," II., 280-281).

The fact of these three Celtic nations being isolated, as mentioned by Niebuhr, in Spain, would point to the inference that the Celts were the original inhabitants of the greater part of Spain, and had been split up and driven into the mountain districts by invading races.

Galicia may therefore be assumed as having been occupied by Celts at the time of the arrival of the Phœnicians on their coasts, and that the products exchanged with them were obtained by these Celts, bore therefore Celtic names, and finally that the ports and towns frequented by the Phœnicians in their time had names Celtic in their origin, though also possibly referable to a people still anterior to the Celts. Hence there is an interest to note these names as they occur, and particularly as regards Galicia in general and the valley of the Sil and its tributaries in particular.

Following, then, the coastline northward of the Minho, that of Galicia presents characteristics which distinguish it from that lying to the south of that river. A series of bays called "rias" or fiords present themselves, amongst which are four of the finest harbours in Spain, Vigo, Pontevedra, Coruña, and Ferrol. In the Br. Encyclopedia (edition of 1855), the following remarks are made regarding the province and its coastline, rivers, &c., p. 372 :—

"The coast of Galicia is everywhere bold, and may be safely approached by mariners. It is much more broken, however, than the coasts of Asturias and Biscay, being more exposed to the violent action of the strong currents of the Atlantic, which run in these latitudes at the rate of half a mile an hour. Hence many secure havens have been in the course of ages scooped out by the storms and currents, and its deep inlets thus formed, with its lofty promontories, give this peculiar feature to this coast. Rivadeo, on the left bank of the Miranda, has a safe and capacious harbour, with three fathoms of water at ebb tide. Vivero Bay is one mile wide and runs three inland, affording good anchorage throughout, with from six to eight fathoms of water. Still further westward the bay of Stanques la Verre, or inlet of Barquero, on the east side of the punta de la Estaca, is an excellent harbour, three miles wide and six long, with anchorage in six fathoms. The harbour of Ferrol is said to be the best in Europe; it is ten miles long and from a quarter to half a mile in breadth, with sufficient depth of water to allow the largest vessels to approach the town, which stands five miles from the entrance, and frigates may pass two miles further up. A long narrow peninsula separates the bays of Betanzos and of Ayres from the harbour of Ferrol, opposite to which stands the port of Coruña. The great bay which forms the common entrance to all these inlets is the *Portus Magnus* of the ancients. About one mile north of Coruña stands the famous lighthouse, called the Tower of Hercules, or the Iron Tower, which was repaired in 1788. It is 92 feet high, with walls $4\frac{1}{2}$ feet thick. The construction proves clearly that it was built

by the Romans, and an inscription discovered near its foundations informs us that it was built by Caius Servius Lupus, architect to the town of *Aqua Flavia*, and that it was dedicated to Mars. The principal port on the western coast of Galicia is the deep, capacious bay of Vigo, in which the largest vessels may ride securely one mile above the town. The climate is variable but temperate on the coast; forest trees abound on the hill slopes; the woods abound with game in great variety, while the rivers and indented shores teem with fish, especially trout, salmon, anchovies, tunny, lamprey, and the '*besugo*,' or 'hog fish,' which has no bones and resembles the lamprey in the richness of its flavour."

The language of Galicia is a harsh, uncouth dialect, quite unintelligible to Spaniards, who sneer at their use of *u* for *o*, and yet from it and the dialect of the Asturias the modern, elegant, and refined Castillian has sprung. These interesting keys to the origin of their language have never yet received the attention they deserve from the Spanish philologists.

Page 373.—Advancing northward, prismatic formations begin to appear as the outlines of the hills become bolder, and near Coruña lofty granitic ridges stretch as far as Cape Ortegal. These granites, which seem to be a continuation of those of Cornwall, contain an abundance of the common tin ore, the working of which is laborious and not very profitable to the Galicians, who are far behind in scientific and mechanical appliances. There are strong probabilities that the Phœnicians visited Galicia as well as Cornwall and the Cassiterides for this tin ore. In former times gold and silver were also among its mineral wealth, but at present lead, tin, and copper, which are found chiefly along the northern coast and along the banks of the Miño, are the only riches of which the mines of Galicia can boast.

The most interesting of these fine harbours is Coruña, with its ancient tower of Hercules, already mentioned. In Smith's Dictionary of Greek and Roman Geography it is stated to be identical with the ancient "*Brigantium*" or *Brigantia*. "Some geographers identify it with El Ferrol, others with Betanzos, others with La Coruña, identifying the ancient tower at this place with the great lighthouse of Brigantium, mentioned by Orosius."

Reclus, in the translation of his "University Geography," vol. i., p. 459, says of Coruña:—"On a small island near it stands the tower of Hercules, the foundations of which date back to the Romans, if not to the Phœnicians." O'Shea, in his "Guide to Spain and Portugal" (1892), speaks of it as follows:—"La Coruña, formerly called La

Coruña (Corona), and 'Groyne' by the English, is said to have been founded by the Phœnicians. The Torre de Hercules, on the site of a Phœnician pharos, which rises one mile north-west of the town, was repaired by order of Trajan." It is worth noting that, as regards the name, the English term "groyne," mentioned by O'Shea and others, is descriptive of the form of the harbour. Thus Wedgewood, in his "Dictionary of English Etymology," p. 184, gives for "groin":—1, "Snout of a swine," and 2 (Metaphor), O. Fr. "Groing," cape, promontory, tongue of land jutting out into the sea, hence English "groin," a wooden jetty built into the sea for the purpose of letting gravel accumulate against it for the defence of the coast. From the same source is the old name of "The Groyne," erroneously supposed to be a corruption of Coruña.

Now the form of the land which makes the port of Coruña, represents such a projection or "groin," hence the name was probably intended to be descriptive, and as it may also have had a Celtic origin, it is worth noting that the dictionary of the Gaelic language (1828) gives the verb *Grunnaichidh*, "to sound the depth"; "find the ground or bottom," in other words "to find soundings." Coruña, or Cruña, or Gruña, would therefore have been the point of the great bay, where "soundings" could be advantageously found. In O'Reilly's Dictionary, "*granaigham*" is "to ground," "sound" (Sc.), and "*grunnal*" is "the ground," bottom foundation. The derivation given by O'Shea ("*Corona*,") offers no reason of itself, and is not accounted for by him. As regards Latin, a better etymology is offered by the word *columna* = a column (in reference to the Pharos), this by the replacement of the *l* by *r*, common in Spanish derivatives, would become *corumna* = *Corunna* = *Coruña*. H. Gadow, "*In Northern Spain*," gives an example of the change in the case of the name, "*Nuestra Señora de Cluniaca*," corrupted into *Crunego*. The important point for the object of the present paper, is that La Coruña may be taken as corresponding to the ancient Brigantium, or Brigantia, said to have been founded by Breogan; and that it is sufficiently ancient to be reputed to have been founded by the Phœnicians, while the fact of a Pharos having been erected there by them would point to its having been a port of great importance for the navigation of these coasts and seas. As a position for commercial enterprise, it presents manifold advantages, above all its excellence as a harbour of safety, so that in the hands of a maritime nation or people, such as the Phœnicians, a very active trade could be continuously carried on from it, not only with the different ports of the western coast of the peninsula, but also

with those of the northern. Thus it would have been in connexion with the copper and cobalt mines existing in the neighbouring province of Asturias, of which one of the most remarkable, archæologically, is and was that of "El Aramo," a mountain, wherein some few years ago, extensive workings with important prehistoric remains were discovered.¹

From Coruña, the Bay of Biscay could be surveyed, and acquaintance made during the fine seasons with the different ports existing along the north coast of Spain, and access thus obtained to the mines of zinc of the present province of Santander, and to the celebrated mines and forges of iron still worked in Biscay, and second to none in the world. That these mines were worked certainly by the Romans, and therefore probably by the Phœnicians, is attested by the discovery of ancient timbering, Roman coins, and lamps, &c., at Reocin (near Torrelavega), and at Comillas.² These advantages would soon have become known to the Phœnicians in the course of their trading, and it is reasonable to suppose that they would have sought to take advantage of them by the introduction of colonies of peoples skilled in the arts of mining and metallurgy, wherever favourable. The "Milesian" colony may have presented these characters, and as it is stated in the tradition quoted, that Milesius had with him a number of young men who had learned the useful arts while in Egypt, such presumption is justified. Their headquarters would have been at Coruña, and from that point they could be in touch with the neighbouring valleys connected with the Sil, or with the ports along the north coast of the peninsula, wherein metals or ores could be had. In the neighbouring district of the Asturias, were, and still are to be found, deposits of amber and jet, matters which, of no high intrinsic value in modern times, seem to have been very highly priced in prehistoric and ancient times, as ornaments, and therefore serving for purposes of barter.

Coruña is directly connected with the district already referred to as the gold district of the provinces of Asturias and Leon, reference to which has already been made as having such an important bearing on the settlement of the Milesian colony in the north-west of Spain. This district has been frequently described in special journals, and in the *Mining Journal* for 1896, occur two or three articles which describe sufficiently fully these notable deposits, for the purposes of the present paper, and from which the following extracts are made:—

¹ See "*Revista Minera*," tome XLIV. 1893, p. 36.

² *Ibid.*, vol. XLII., 1899, p. 47.

"Mining in the Asturias, north Spain"¹:—"The Auriferous zone and its ancient workings." Attention is called to the "large number of ancient workings that exist in the quartzite belt that runs through the province from north to south, and the gold that is found in the clays and gravels of the river beds which run at the foot of these old attle heaps. These ancient workings extend over a district lying between 42° 25', and 44° 32' north latitude, and over 30' of longitude, or over an area of 1110 square miles. The best proof that they were prolific to their ancient workers is the long aqueduct surmounting all difficulties, carried along the mountain sides, and in one instance, from the mountain from some sure source of a never ending supply of water. The district is within three days by sea and land from England, with excellent climatic advantages, chesnut and oak timber is cheap and plentiful, and there are abundant supplies of water for all purposes.

"The *débris* of some of the streams and rivers has for ages occupied a portion of the inhabitants, during summer (the gold gathered each year by the washers of the Sil and other streams of the district was estimated by Dr. Jgnacio Gomez Salazar in a pamphlet published by him in 1855 at 35 to 40,000 Duros), when these waters leave the banks dry, they set to work, here and there, on the gravels and clays, washing out with their ungainly wooden pans ('*Masoiros*'), a penny-weight or more per pan per day, which they sell at the best price they can get to the rich men of their villages.

"When Guillermo Schultz published in 1858 his '*Descripcion Geologica de Asturias*,' he marked on his map that accompanied it, several special places, where washings were carried on at the time. He might have added the whole of the river Orua and Lor, up to where it joins the Navia, a portion of this, and the River Castelo, as the yearly washings were carried on in these two prior to his examination."

"The Orua, thus named, from its source in el Palo Mountain, until it changes farther down to the Lor, runs at the foot of the *débris* banks, of seven ancient workings, situated at the foot of the Sierra Valledor. These form a curve over a distance of about 2½ miles, are within the quartzite zone, in the vicinity of masses of diorite, cropping out here and there on the margin of the river, and within a short distance of the Syenite mass, upon which the village of Lago is built. The extensive watersheds of this river, and its abrupt

¹"Mining Journal," February 8th, 1896, p. 171.

mountain sides increase its body in water to a mighty torrent. Water-worn gold in scales, grains, and dust, is found along its banks; throughout its course into the Navia, a distance of 15 miles, and afterwards along this river's banks for a further distance of 5 miles." The river Castelo, draining another watershed, but having its source on the opposite side of the western divisory of the Orua, is also auriferous. This river passes below the *débris* from the ancient workings known to-day by the name "*La cueva de Juan Rata*," mentioned in the Mining Journal of February 24th, 1894. The river Bao drains the Purnovo Mountain. Here, too, there are a number of ancient workings, and formerly washings were carried on yearly in this river. Both these rivers are tributaries of the Porcia. The excavations and *débris* of all these show the enormous mass of stuff handled, and it is to be presumed that the results obtained were in proportion. In the upper waters of the river Ibias, summer pannings have always been carried on. Here there are no ancient workings. The gold has been transported from the weathering of the Sierra de Tablado, comprising a continuation of the Valldor quartzites, and the gold of the washings that are carried on, on the upper reaches of the river Navia, has been brought from the weathered Sierra de Bastelo, which has an altitude of 1680 m. above sea level. Neither in the one, nor in the other of these, are there any landmarks, in the shape of ancient workings to guide one. The absence of workings is explained, if we bear in mind the climatic differences of summer and winter. Heat in summer, and a long winter of snowfalls, a district scarcely populated, the long distance from the sea coast, and at the time of the ancient occupation, an almost impenetrable region, comprised of mountain fastnesses and deep ravines infested by wolves and bears.

It is stated in the Mining Journal¹:—"These (quartzites) of the western portion continue into the province of Leon, and present themselves as a guide to the goldseeker. Following then this quartzite belt over the divisory Cantabrian range, through the pass called the 'Puerto de Trayeto,' at an altitude of 1450m. above sea level, we find it continuing in a south-west direction on the southern flank of the range. This district is drained by the rivers Sil, Burba, Anclares, and Qua, all of whose beds and banks are auriferous. Thus it continues to Las Medulas and Puente de Domingo Flores. Here it changes to a south-east direction, and continues for many leagues until it is cut off by the mountain range that divides the province of

¹ July 28, 1896, p. 946.

Leon from that of Zamora. This second portion is drained by the rivers Duerna and Eria, both of which are highly auriferous. Throughout the whole of these various districts, there are vast remains of an enormous activity in ancient times; these consist of subterranean labours, immense deposits of *débris*, and the tracings of 'water leats,' carried over long distances, with here and there immense reservoirs, where water was collected to 'boom' the beds of alluvion in their vicinity. Great beds of this have been partially worked by the ancients who, from the remains, such as coins, bricks, &c., met with, were undoubtedly the Romans. They left their mark about the rivers Anclares and Burbia, where there are quarries in the quartzite, and some workings in the quartz reefs, all showing more or less gold. Although the Romans, as stated, had already worked a goodly patch of this, an immense area remains to be treated. For many generations gold has been panned out by the country people during the dry season, from the banks of the Sil and its tributaries, the Burbia, Anclares, and Qua."

The Mining Journal also gives¹:—"A description of portions of the auriferous deposits in the valleys of the Sil, Cabrera, and Duerna, prov. of Orense, and Leon, Spain: by Captain C. C. Longbridge, M.I.M.E., &c."

1. "General description of the Ground."

"The deposits of the Rio Sil are first noticeable at Puebla de Brollen, a village between Monforte and San Clodio, and appears to continue with some interruptions to Querenó, on the portion of the Orense province. The bulk of the alluvial deposit therefore lies some 50 to 200 feet above the bed of the Sil, and is easily traceable by eye, *owing to the bright red ferruginous tint of the gravel*, and the darker tints of the conglomerate (see remarks already given as to the origin of the name Minho or Miño). Throughout the distance of, approximately, 75 miles the river Sil flows roughly east and west, and is fed by some small tributaries or mountain streams, such as the Casallo-Millaroso, Entomas, and Reciueno, running downwards from the northern watershed. At Querenó the Sil is joined by the Rio Cabrera; but the chief alluvial deposit lies some miles on the left or north of the river, around the pueblo or village of Medullas, which can be reached by mule in two hours from San Domingo Flores. The deposit of Medullas is remarkable not only for its magnitude, but also

¹ January 29, 1898, p. 139.

for the scale on which it has been exploited by the Romans. The extent of these workings is evinced by numerous mounds of *débris*, and by the lofty escarpment of several hundred feet; that, allowing for subsequent sub-aerial erosion, mark the quantity of matter removed. Although barometric observations showed the summit of these deposits to be some 1090 feet above the bed of the Cabrera, at San-Domingo Flores; the bed of this ascends so rapidly that the ancient miners were able to obtain water by a series of canals, stated to tap the river at distances from 16 to 25 miles. Much of these canals, it is said, still exist and could be repaired with little expense. In the upper levels of the alluvial, there are at places tunnels or galleries which would seem to have been used partly as water conducts. At Medullas, as elsewhere, the alluvial consists of *earth and gravel brightly coloured by oxide of iron*. At Quintanilla, some 9 miles from Astorga, there are numerous vestiges of Roman alluvial, and in the neighbourhood there is said to be an auriferous reef which was worked by the ancients."

These details, given by a mining engineer, show at once the importance and antiquity of the auriferous district he describes, and thus allow of its historical and archæological interest being appreciated. Although he only speaks of the Roman remains found in the waste heaps, it is not consequently to be inferred that the deposits and the ground which yielded them were not worked before the arrival of the Romans. On the contrary, the fact of the Romans having undertaken such vast works on them, leads to the presumption that they must have been extensive and highly productive before their time, just as in the case of the Rio Tinto mines in Andalusia, where, along with vast masses of scoræ undoubtedly Roman, there are found waste heaps equally vast, which show by their different percentage in copper and other remains of tools, etc., the treatment by a people anterior to the Romans, and considered to have been, at least, Phœnician, or some such people. This district has, by some, been identified with the Tarsish of the time of Solomon.

By what race or races the gold was mainly worked in Asturias before the arrival of the Romans is not, at once, evident; most probably it was by a race of mountaineers, accustomed to the pursuit of the metal, having the tradition of the methods proper to this class of work, and content to carry it on as a livelihood for very small earnings, as at present is the case, both in this district and in many hold-washing districts of the world. As bearing to some extent upon this point, the article on "Mining in Asturias" ("Gold Mines of the

Ancients") which appeared in the Mining Journal, 24th February, 1894, p. 199, is worth being cited from. The writer says: "The Cambrian zone, lying between the R. Navia and the R. Canero, is notable for the immense belt of quartzite that passes from the sea, on the north, through the whole province, interning in the province of Leon on the south. Between Salime and Pola de Alende, and about six leagues to the south of the town of Navia, near the village of Lago (altitude about 800 m. above sea-level), there is a mass of feldspathic diorite, about 200 m. wide. This has not affected the adjacent stratified beds, which are comprised of chloritic schists, and to the S.S.E. and E. of this, there is a run of common diorite, in the vicinity of which (near the banks of the R. Valledor), there are several ancient workings for gold. Here between the two groups (that of the village of Celon and that of Pola de Alende) the schist is altered, first to gneiss, then to micaschist; afterwards talcose and twisted; sometimes fibrous; generally of a white colour, and very lustrous; often of a pearly white. In these, near the village of Figueras, there are some ancient workings, and in the pearly white schist, there are thin veins of true asbestos, having a good fibre, to be worked at some future day. At Iboyo, under the saccharoidal limestone, there are some ancient workings in hard porphyritic diorite. The eastern margin of the great quartzite zone marks the greatest development of the ancient workings. These form a string from Vegalar, two leagues S.-W. of Cangas de Tineo, for a distance of eight leagues, to near Trevias, S.-E. of Luear, the limestone band serving as a guide. All these had their canals to bring the water, often long distances, above the level of the workings; these canals were made along the irregular sides of the mountains, and show to-day that the engineering skill of these ancient miners was well up to the mark. Some of these workings have two or more canals from different watersheds, so that when, on one side, the supply was insufficient, they soon went in a contrary direction for a further supply. There are several cases where they tunnelled through an intervening ridge to get the water through, after bringing it from a long distance; such is the case at Montefurado, where the water was required for the working of the mine, which to-day is known as the *Cueva de Juan Rata*, celebrated in the folk-lore of the country." Montefurado is thus described in Viv. de S. Martin's Dict. de Geogr. Univ.: "A village (bourg.) of the province of Lugo, at 64 kms. S.S.E. of Lugo, district of Quiroga, at 367 m. altitude above the level of the R. Sil. The river here passes subterraneously by a canal of

Roman construction cut in the rock. The mines of the environs, for the working of which this colossal work was executed, are now abandoned. On the fall side the Sil flows in a defile of 400 m. depth." "A tradition has been carried down that this cave holds an enormous treasure, and to obtain it a passage has to be made through a gallery closed by an enormous door. It is guarded by the *Janas* (the antique gnomes of the miners of the Hartz mountains); that any that find their way in will never come out again, but will be compelled to join in a Maccabean¹ dance, terminating in madness and death." Notwithstanding this, many years ago, some of the country people, overcome by their cupidity, joined together to lay bare the treasure, in spite of the attempts of their spiritual advisers to dissuade them. They commenced work; and for a few days all went on "as merry as a marriage bell"; but their ignorance of the rudiments of mining brought the roof about their heads, and they were buried under the ruins they had brought upon themselves. They were looked upon as apostates, condemned, and left where they had fallen. No further attempt has been made to reach the treasure. Nothing can be seen to-day to show what or how they worked, beyond the immense attle banks and the gold found in the stream draining this.

As regards the "*Janas*" which the tradition says guard the door of the treasure, it is worth while citing the remarks made in Smith's "*Greek and Roman Mythology*" as regards "*Janus*." ("A god peculiar to the Italians; he was, however, regarded as one of the oldest, holiest, and most exalted of the gods. In course of time he became the god of all going out and coming in, to whom all places of entrance and passage, all doors and gates, were holy. In Rome all doors and covered passages were suggestive of his name. Over the latter the arches which spanned the streets were called *iāni*. From him sprang all wells, rivers, and streams. He was described as the discoverer of the art of shipbuilding. '*Janus*' and '*Jana*' are only other forms of *Dianus* and *Diana*. The fact of '*Jana*' being identical in import with '*Luna*' and '*Diana*' is attested beyond doubt by Varro. Whether the Etrurian divinity, with two or four faces, was originally the same as the Roman Janus, is uncertain.")

"A number of these ancient workings are on the banks of the river Ouro, which before it falls into the Navia, has its name changed to Lor, the former being the local name for Gold, and both originating from the same word, *Oro* = gold. The country people pan this river, getting fair results in their crude operations. Their pans are roughly

¹ *Query* "danse Macabre."

cut out of blocks of wood, and are called in the locality '*Masoiros*.' The gold they find in these streams is coarse and in quality fine, and in all probability proceeds for the most part from the immense attle banks of the ancients, carried into the streams by the winter torrents washing them gradually away. The attle from the *Cueva de Juan Rata* is washed into the river *Castello*, another tributary of the *Navia*. As a rule there are no bodies of alluvion, as the rivers run in deep narrow beds between precipitous sides, but where the *Navia* has washed out its bed, in softer bodies of rock, and where it bends at sharp angles across these beds, when the water is low in summer, washing has been carried on from time immemorial by the peasants, and successful results have been obtained. One of these bends has been carefully prospected by the writer, and it proved that a systematic clean-out of the bed-rock and of the interstices between the layers of schist pitched against the river floor, would yield enormous results. The thunderstorms cause the river to rise very suddenly from 3 to 6 feet, so that a wall of 6 feet there would rarely be flooded in summer. Portions of the banks prospected above the river-level, the washings of the soil accumulated about the roots of the moss and heather growing on the rocky sides, together with sample of the clay, yielded slightly over two (2) oz. of coarse gold, some grains being of the size of wheat grains."

With regard to the tradition related in connexion with the "*Cueva de Juan Rata*," and the enormous door therein guarded by the "*Janas*," it is worth while giving the following extract from Bailly's "*Lettres sur l'Atlantide*," pp. 147-8:—"Gian ou Gian ben Gian était le monarque du Peris ou Fées. Il fut fameux par des exploits militaires et par des superbes ouvrages. Il regna pendent 2000 ans sur les Péris. Gian ben Gian fut attaqué et vaincu dans un combat général et la nation dispersée, Les traditions renferment evidemment la notion d'un peuple détruit et perdu. Les Orientaux l'ont exprimé dans une ancienne epitaphe, où l'on dit 'Qu'est devenu le peuple de Gian ben Gian'? regarde ce que le temps en a fait" (Herbelot, p. 396).

The tradition may have reference to "*Janus*" and "*Jana*," the Roman or Italian deities who presided over doors, &c., and the works referred to may, as many others, have been carried on under the Romans, but they may represent a still older people. In this respect it is of interest to cite the following remarks from Hans Gadow's book, "*In Northern Spain*" (1897). Speaking of the remarkable race of carriers known as the "*Maragatos*" of Northern Spain, he says, p. 180:—"The *Maragateria* coincides practically with the range of hills, which running from north to south, are generally called the

'Montes de Leon.' They are visible across the plain, above which they rise on the average some 800 feet. Plenty of abandoned mines, ascribed to the Romans, bear witness that in olden times these hills have been worked extensively for iron and silver; zinc and lead ores are also found. Justinus speaks of a *Mons Sacer* within the confines of Galæcia, which mountain was not allowed to be opened with tools, but if one of the frequent lightnings should break the ground, then the people collected the lumps of gold which might thus come to daylight, and they considered them as God's gift. Risco, in '*España Sagrada*,' and others since, recognize this '*Mons Sacer*' as the present Monte Irago to the south of Fuen Cebadon. It is not very obvious why. On the contrary, there are reasons against it. There is no gold to begin with, at least not in nuggets, and then, what does '*in confinibus Gallæciæ*' mean? It is true Galæcia comprised originally a much larger part of Spain (than at present). It is probable that part of the present province of Spain belonged to it. '*In confinibus*,' on the frontier of Galicia, well and good, and that may possibly do for the Montes de Leon; but if '*in confinibus*' means '*within*,' as it ought to, then the '*Mons Sacer*' has to be looked for somewhere else; where there is gold, where thunderstorms do break off and wash down portions of a mountain, where there is a mountain or hill of striking appearance, and last, not least, one which is situated at a place which can be described but vaguely. Such a hill which fulfils all these requirements of the Mons Sacer, exists between Villafranca and Burbia; of this more anon. But the Monte Irago lies a few miles to the west of Astorga, and so it did when the town was still called Lucis Asturum."

It may be remarked that "*Mons Sacer*" means a mountain devoted or consecrated to some divinity. Hence to find the "*Mons Sacer*" in question, a name of a hill or mountain situated "*in confinibus Galæciæ*" should be looked for capable of bearing, or bearing this title. The tradition recounted relatively to the "*Cueva de Juan Rata*," or mine so called, near Montefurado, already mentioned, furnishes perhaps a solution of this problem, and in the following way:—"Montefurado, of which a description has already been given from the '*Dict° de Geo. Univ.*' de Vivien. de St Martin, may fairly pretend to be a hill or mountain of striking appearance." Moreover, the "*Montefurado*," or "*pierced hill*" is situated in the valley of the Sil, the principal river of Galicia, and not far from its confines with the province of Leon; but the chief interest of the question lies in the name "*Juan Rata*," and the door guarded by "*Janas*." May not the name "*Juan Rata*" be merely the

local corruption of "Jano-Bata"?; that is, the *cueva* or Tunnel "consecrated to Janus," or "Jana," who essentially presided over doors, and passages, and vaulted openings? This then would be a veritable "Mons Sacer"; but this character is completed, by the fact already stated in the Mining Engineer's report, that the heavy rains, accompanying the thunderstorms so frequent and so violent in these districts, sweep down into the river Sil below, gold dust and scales, which up to this day the peasants collect in the manner already described. Nor would this be the only "Mons Sacer" in the district, since among the summits or "Picos de Europa," a remarkable group of mountains lying between the Asturias and the province of Santander, there is a "Pico Jano," said in the country to be so called from the fact of its having been dedicated to "Janus." Moreover, in it there was in 1860 (at least) an ancient copper mine representing a gallery which up to that time had not been completely explored. Would not this dedication of mines and mining galleries to "Janus" or "Jana" point to the presence in these countries of a race anterior to the Romans, such as the Etruscans, of whom this god was among the principal divinities, and which was renowned for its engineering works of great magnitude, and particularly for the execution of tunnels such as the "Cloaca Maxima."

If this presumption be correct, the names of the rivers, places, and towns of the district should offer some indications in that respect. Attention has already been called to the names of the river Minho, or Miño, and the descriptions given of the alluvial deposits along the river sides show that the root "*min*," in the name, refers to the red oxide of iron which so strongly and so markedly colours them, and serves as a guide to the exploring miner in search of these deposits in the district. In the "Dictionary of the Gaelic Language," vol. ii., p. 677, *meinn*, *miotailte*, is given as the Celtic equivalent for "ore." Assuming, therefore, the Celtic origin of the name Miño, or Minho, would be the river carrying or showing the ore, and would, even to the present, be a very characteristic name. If this be true of the Miño, its continuation inland, the "Sil," should present a somewhat similar meaning. As a matter of fact, the word "Sil" has a Celtic meaning, the same dictionary giving for it the signification, "a drop" (*gutta*), and the verb "Sil," "Silidh," has the meaning "rain," as well as to "drop," "distil"; and thus the Sil might be understood as the river which "dropped," or "rained," or "sowed" the gold dust along its banks. In Spanish there is actually the word "*sil*," signifying "the red ochre used by painters." The river names of the gold

district already mentioned, the *Orua*, the *Lor*, as well as the name "Sierra Valledor," may be construed as having the root "or," gold, or "orach," abounding in gold. As regards the other rivers of the district—the Anclares, the Bal, the Burbia, the Duerna, the Eria, the Braña, the Ibias, the Navia, the Porcia, and the Qua, and Ulla—it would be very venturesome to attempt etymologies or derivations in the absence of any other data than the mere names as given on the maps of the present date. It may, however, be remarked, that the names Eria and Ulla, recall the Celtic names of Ireland and of Ulster; but nothing precise or well founded could be based on what may be treated as mere chance resemblances. There is, however, one local name which may have great significance, and to which attention may therefore be called; it is that of the mountain mass lying between Luarca, on the coast, and Cangas de Tineo, in the south, and which forms the eastern boundary of the valley of the river Navia; it is indicated on the map as the *Sierra de Rañadoiro*. It would bound the gold district of the Asturias to the north-west, and is, therefore, to a certain extent, connected with it; may it not, therefore, be of Celtic origin, and represent the words "*Rath-na-oir*," "the rath or fort, or hill of the gold"? Luarca, which may be said to be the port of the district, is thus described in the "*Dict. de Geo. Univ.*," de Vivien de S. Martin:—"Luarca, town of the province of Oviedo, at 60 km. therefrom, on the borders of the Atlantic, and at the mouth of the river Negro, which flows from the Sierra de Rañadoiro. The harbour has a bottom of sand, is badly protected, not spacious, and is shallow. It can only receive but small vessels ('de petites, et à la rigueur, de moyennes embarcations'). The inhabitants of Luarca formerly caught whales on their coasts."

It may be remembered that a whaling population must be good sailors, and able to make trips farther to sea than ordinary fishermen. Hence Luarca may have been a port of much more importance anciently than it is at present, and may even suggest a possible key to the relations of Spain with Ireland. If any importance is to be attached to the Celtic derivation of the local names in this district (and H. Gadow has suggested a certain number in his "*Northern Spain*") they would tend to prove that Celts were the most ancient inhabitants of the mountainous parts of Asturias and Galicia, and would justify the carrying of the research into the names of the tools, utensils, &c., which have come down from the Celtic populations.

Now the mining captain, from whose report on the auriferous alluvial of the Sil, extracts have already been given, speaks of the

natives as washing the *débris* of the alluvions in their rude "*masoiros*," or wooden pans. This word can be derived from the Celtic "*mias*" = a dish, a platter (O'Reilly), and "*or*" or "*oir*," "gold" or "golden"; so that the "*masoiro*" of the Asturian gold-washer is the "*gold panning dish*" of his Celtic predecessor. Had the mining captain in question made more careful inquiries as to the terms employed by the washers for their tools and operations, he would probably have been able to collect some, if not many, other such antique terms. In an excellent work on the French Pyrenees, by Eugene Trutat, he describes the gold washings at Pamiers in the Comté de Foix, and gives the following names of the tools employed by the washers:—

The "*andusa*."—"A shovel having the edges turned up at the sides, by about 4 lines, $9\frac{1}{2}$ inches long by $7\frac{1}{2}$ inches wide, used for the removal of large pebbles which usually cover the finest gravel." This may be explained by the Celtic *an tuis*, the (piece) laminated, or made thin."

"*Balme*."—"Finer part of the deposit intermingled with masses of pebbles. "*Bal* = *Ball*," in Irish, means a "speck," a "spot," *mi* = a diminishing compound article; so that "*balmi*" would signify a very fine speck (such as is usually presented by the gold as the result of the washing). In the Cornish mines, where *tin sands* were usually washed and separated by girls; these were termed "*balgirls*."

The "*greffane*," or "*gressale*."—"A sort of wooden plate, 1 foot 6 inches to 1 foot 9 inches in diameter, hollowed out to 3 inches in the centre for washing."

"*Slane* or *griffaun*," is the name given in Mayo to a form of spade or shovel without wings. (There is still in use on the washing floors of the Cornish mines a shovel of about the same dimensions, as mentioned for the "*greffane*," and used in the same way, for separating or "panning" fine ore). The other word, "*gressale*," may be explained by the Irish word "*gris*" = tremor, which very exactly explains or describes its mode of action.

The "*scudelle*" = "a small wooden bowl for receiving the black sand and (accompanying) gold." The Celtic word "*scotuil*" = "chosen," "elect," explains sufficiently this term.

It may be mentioned that in Spain there is still in use a tool called a "*laya*," a long two-pronged fork, used for tilling ground, which seems to correspond with the Irish "*laye*," also still in usage.

In the work cited (E. Trutat, "*Les Pyrenées*"), the author describes the Catalan forges still being worked in the mountains, particularly at Rancié (Arrière), and mentions in detail the ores and fuel

used, and the names applied to the different parts of the furnace. He says (p. 171):—"Dans le cas de la 'mine' (iron ore) c'est épigène, les mineurs la désignent sous le nom de mine a '*gra de gabach*' (graine de blé noir); this is seemingly the Celtic '*grán*' = 'grain, corn, haul, shot,' and *gabá* = a smith." He adds:—"Les mines de fer de Rancié ont été exploitées dans la plus haute antiquité, et elles ont toujours été, une sorte de propriété commune, que les habitants du pays ont seuls le droit d'exploiter."

Page 187.—He describes one of the qualities of iron obtained from these forges, and gives, as the name, by which it is known in the country, "*Cídat*," which he explains as a "Variété de fer (Catalan) qui casse à noir et a violette. C'est une qualité supérieure à acier naturel. Elle est recherchée dans le commerce pour l'agriculture." "May not this have to do with the Celtic *Ceacht* = 'plough,' a plough-share."

The fame of the Spanish steels was great in antiquity, and it is of interest to point out one of the sources whence in all probability it proceeded, and its connexion with Celtic races.

At page 335, when speaking of the "Béarnais," he says of them:—"La race est évidemment une de ces nombreuses familles gauloises qui occupaient l'extrême midi de la province, connue sous le nom d' 'Acquitaine,' avant l'occupation romaine. Les Benarenses (Bearnais), and les Osquidates (habitants d'Aspe, d'Ossau, et Barets) formerent les premiers éléments de notre race."

The gold district of northern Spain extends southwards into the province of Leon, as already shown, and is watered by the Sil and its tributaries, all for the most part carrying gold in workable quantities, at least for peasant workings, during the summer months. It would seem at first sight that the natural outlet for the trade in gold dust from this district should be by the valley of the Miño, and such may have been the route taken by some of it, but between the city of Leon and La Coruña there exists, and has existed, from remote antiquity, a trade route by which most of the traffic of merchandise between these two points has been customarily carried on. Gadow, in the work already cited ("In Northern Spain"), p. 171, when describing the province or kingdom of Leon, says:—"The old kingdom of Leon is connected with Galicia by one of the most famous roads in the whole of Spain. Practically the only road mapped out by nature, it was followed by all the successive masters, or would-be masters of the north-west of the Peninsula." Then, in describing the "Maragatos," in whose hands this trade has long been, and the district they inhabit,

the "*Maragateria*" lying between Ponteferrada and Astorga, and coinciding with the range of the Montes de Leon, he says of them:—"Absolutely trustworthy, honest and diligent, they have in their hands the whole of the trade from Coruña to Leon." They would be at present, and probably were in the past, the conveyors of the products of the gold washings of the Sil valleys to Coruña, since they are recognised as a very distinct and well marked race, having peculiar habits and holding themselves somewhat apart, and, in consequence, having attracted the attention of the travellers who have undertaken to describe these parts of Spain. Ford, in his delightful book, "*Gatherings from Spain*," gives an elaborate account of these people. (Gadow, work cited, p. 175). It has been sought to connect them with the Berbers as to their origin, but there is a possibility that they may represent the remains of that Milesian colony which came from the Mediterranean and settled in Galicia under "*Bartha*," and which peopled ancient Galicia, that is, a district comprehending not only the present province, but also a considerable part of Asturias and the province of Leon, "its boundaries having been on the south the river Douro, on the north-east the river Navia, and on the east the mountains of the Asturias, or Asturians, so that it corresponded almost exactly to the modern Galicia, with the addition on the south of the Portuguese provinces of Entre Deuro e Minho and Tras os Montes, and on the east of some small portions of Asturias and Leon. Sometimes a wider extent was assigned to the country, so as to include the Astures."¹

That a Celtic people worked the mines abounding in the Pyrenees, and more particularly the gold mines or washings, may be inferred from the local names of rivers and tools already referred to, and that Coruña was a point of outlet for those metals and ores during the period that it was frequented by the Phœnicians may also be admitted, while at the same time it served as a basis for maritime explorations and expeditions by this remarkable people putting them in relation with all the accessible ports of north Spain and those of the west coast of France or Gaul. A trace of this intercourse is probably preserved in the name of vessels which are in use along the northern coast of Spain, and which, by reason of their size and qualities, are adapted for the navigation of its ports and harbours. They are called "*lanchas*" (Eng. launch, Fr. lanches), and are about the size and style of the

¹ Dion Cass. xxxvii. 63; Plin. iii. 3, s. 4; xix. 1, s. 2). (Smith's "Dictionary of An. Geography.")

Penzance herring boats, that is, from 25 to 30 tons capacity, carrying two lug sails, and decked forward and aft. The word may be derived from the Celtic, *long* and *sean* = "old ships," and if this be correct it offers another connecting link in the relations between north Spain and Great Britain. By the intercourse of this class of vessel with the coast of Gaul the Phœnicians soon became aware of the existence of, and the routes leading to, the British Isles, and the products to be obtained therefrom.

If, therefore, subsequently to their establishment at Coruña, a period of quite abnormal drought set in, affecting disastrously the greater part of the peninsula, and lasting during quite an unheard of succession of years, and forced large numbers of the inhabitants to emigrate, it can easily be conceived that Coruña became a port of embarkation, since there would not only be found vessels able to carry the emigrants to other lands, but a knowledge of distant countries where more favourable conditions of life could be found, and where the mining and metallurgical experience acquired in Spain could be turned to account and trading stations established.

According to the article on the British Isles in Smith's "Dictionary of Ancient Geography," and in treating of the tin trade of the Phœnicians with Cornwall, it is stated:—"In round numbers we may lay the beginning of the Phœnician intercourse with Cornwall at B.C. 1000." It is further stated:—"It must have been either an instinct or an accident that brought the first vessel from the Mediterranean to the coast of Cornwall."

Further, the writer says:—"The earliest gloss that has a bearing upon the geography of Britain is the word '*Cassiterides*,' for it must be observed that while the word '*Brittania*' is non-existent in Herodotus, the Orphic extract (given in the article) knows only the Irish (Iernian) isles. Now this word (*Cassiterides*), though bearing on Britain, is no British word. It is the oriental term *Kastira*. Were the word British in origin we should be enabled to enhance the antiquity of the Cornish tin trade, since the word '*Kassiteros*' occurs both in Homer and in Hesiod, who shall say, however much the possibilities may be in favour of the Homeric and Hesiodic tin being Cornish, it was not Indian, i.e. Malayan. The tin trades may have been concurrent, the Eastern one the oldest, at least that is what is suggested by the name."

The writer seems here to ignore the other sources of tin, which may have been and probably were known to the Phœnicians, those of Spain (environs of Salamanca) and the north-west of Gaul. These

would have become known to the Phœnicians as soon as they began to trade along the west coast of Spain from Cadiz to Cornuña, later on as regards Gaul, when they became acquainted with the northern coast of Spain and the western coast of Gaul. If, therefore, their arrival or first trading with Cornwall be placed "roughly" about 1000 B.C., it is reasonable to suppose their previous acquaintance with the west coast of Spain, and the north coast of same at a still earlier date, and to place this acquaintance even earlier than the date usually given for the foundation of Cadiz, viz. 1100 B.C., since it is hardly to be assumed that that city was founded immediately on their passing the pillars of Hercules rather many years afterwards, when the extent of their trade and their knowledge of the country had developed to the point of giving rise to its foundation. These are the considerations which, along with other reasons already dwelt upon led the writer of the present paper to place the arrival of the Milesian colony in Ireland somewhat about the twelfth century B.C.

Taking Professor O'Curry's "Lectures on the Manners and Customs of the Ancient Irish" as a guide, we have the following as the first mention of the working of gold in Ireland, vol. II., p. 5:—"The next entry to be found in our ancient authorities, throwing any light upon the progress of our early civilization, is found in the records of the reign of Tighearnmas M'Tollaigh, *one of the earliest of the Milesian kings of Ireland*. Tighearnmas, who was of the race of Eremon, became king in the year of the world 3580, according to the 'Annals of the Four Masters,' or 3089, according to the chronology followed by M'Geoghegan, that is about 1620 years B.C. according to the former, or 915 B.C. according to the latter authority. And this king is everywhere recorded as having been the first to discover gold and to work gold mines in this country. The precise situation of these original gold mines is not laid down for us; but it is recorded that it was in the forests standing on the east side of the river Liffey; that the ore was smelted by a worker in metals of the name of Juchaden, who was a native of that district. We may therefore fairly infer that the gold itself was discovered in Leinster, and this opinion is strengthened by our finding the people of Laighin or Leinster, called afterwards '*Laighnigh-an-oir*,' or the Lagenians of the Gold, because as it is stated, it was in their country that gold was first discovered in Krinn."

To this same monarch is attributed the introduction of ornamental drinking-cups, and of colours in dress, as well as ornaments of brooches of gold and silver.

Page 7.—“In the year of the world 3872 (*i.e.* 132 B.C., according to M‘Geoghegan’s Chronology) died the monarch Muinemon, of the race of Eber. It was this Muinemon who first caused chains of gold to be worn on the necks of kings and chiefs in Erin. About the year 3870 died Mainmaric, King of Munster, of the line of Eber. He was the first that purchased gold and silver in Erin. In the year 3882 (B.C. 122) died the monarch *Fail-dern-doid* (*i.e.* the ‘Man of the red-ringed hands,’ of the line of Eber. He was the first that caused rings of gold to be worn on the fingers of the nobles of Erin.”

“In the year of the world 4463 (A.D. 459) died the monarch Lughaid Laigne, of the line of Eber, after a reign of seven years. He was the first that invented bronze and bronze spears in Erin.”

O’Curry gives the following details concerning the localities in which gold was worked in Ireland, which may not be wanting in interest for the purposes of this paper, vol. III., p. 204:—“He mentions ‘*Credne*,’ the celebrated ‘*cerd*’ or goldsmith of the Tuatha de Danann. His name was derived from ‘*credh*,’ the ore of the precious metals in which he worked.”

Page 205.—“The bog of Cullen is situated in the parish of Cullen, barony of Clanwilliam, and county Tipperary, and on the immediate border of the county of Limerick. From time immemorial gold has been found in all conditions of preparation from the primitive ore to the most beautiful of fashioned ornaments, nay even to the very crucibles. Small bronze saucepans, with the gold arrested in its progress of smelting or boiling, have been found in this bog and its neighbourhood.”

Page 207.—“There was anciently in this district a small chieftancy called ‘*Cerdraighe*,’ that is, ‘*the territory of the goldsmiths*.’ The Cerdraighe of Tulach-Gossa were named ‘*Cerdraighe*,’ because every man of them was a *cerd* or ‘goldsmith’ for seven generations.”

Page 208.—“And so we find that the trade and art of gold manufacture, if not of gold melting and mining, was carried on in this district, probably on this very spot, during the long period of 221 years from 234 A.D. to 474.”

It is worth mentioning here that the mineral district of silver mines in the county Tipperary is only about twelve or fifteen miles to the north of Cullen, and that the ancient mineral land of “*Mianus*,” now *Meanus*, in the county Limerick, is only about the same distance to the west of that town.

Page 210.—The first “*Cerd*” is *Croidne*, who takes his name from “*Credh*,” which signifies the ore of copper, gold, silver, &c. The

artist is mentioned in the oldest historical tract that we now possess; the battle of the Southern Magh Tureadh, fought between the Fírbolgs and the Tuatha de Danann. His scales, weights, and measures are mentioned in our ancient laws, and his decisions about metals and metallurgy have been acted upon in Brehon law, almost down to our own time.

"Credne was drowned—
The cunning 'Cerd'—upon the wide
Sea of dangerous waters
Whilst bringing over golden ore
Into Erin out of Spain."

The last line is singularly interesting, as showing the connexion between Ireland and Spain as regards the art of metallurgy in particular, and bears directly on the subject matter of this paper. The question is suggested by it: From what point of Spain was the ore being brought? "The wide sea of dangerous waters" may be simply a poetical expression, and point to no sea in particular, but it is well qualified to characterize the Bay of Biscay, and so far would point to the north coast of Spain as the place from which the "golden ore" was being brought. It has been already agreed that gold was worked in the Pyrenees by Celtic or Ibero-Celtic tribes, and extracts are given from Trutat's "Pyrenees" to that effect. Now there is a portion of the eastern Pyrenees still known by the local name, "La Cerdagne, or in Spanish La Cerdaña"; it is thus described in the "Dictionnaire de Geographical University," already cited. "Pays situé sur les deux versants des Pyrénées orientales (en France, Roussillon, en Espagne, Catalogne), dans les vallées supérieures du Segre et de la Tet. Les villes principales sont, en France, Saillagouse and Montlouis; et en Espagne, Puycerda et Livia ou Llivia, Cette dernière présente cette particularité, qu'elle forme une enclave espagnole, complètement entourée par le territoire français du Department des Pyrénées Orientales. La Cerdagne garde le nom des Anciens Ceretani, peuplade de sang Iberien, La plupart de ses bourgs et villages, sont sujets a de très longs hivers, et le climat est très froid à cause de l'extrême altitude du sol. On y parle plus on moins le français au N. l'espagnol au S., mais la langue national est encore le Catalan."

An examination of the map of the Pyrenees shows that this district lies near the sources of the Ariège, and not far from the Comté de Foix, the gold washings of which have been referred as furnishing Celtic terms for the tools therein used by the washers.

Now the diminutive of "Cerd" is "Cerdan," and "Cerdaña" or "La Cerdagne" would be territory inhabited by the "Cerds" or "Cerdans," and it may be that this was one of the principal centres of the tribes which inhabited these elevated peaks and valleys along the whole line of the Pyrenees wherever metals were to be found, and worked from east to west, and the wealth in metalliferous ores of the whole chain has already been insisted upon.

The conclusion which we may come to is, that seemingly the Milesians introduced the art of working gold into Ireland, and that they had acquired their knowledge and experience in Spain, and in the Mediterranean countries which they are said to have visited. Taking the date assigned for the reign of Tighearnmas by M'Geoghegan, and mentioned by O'Curry as 915 B.C., and adding the years which represent the reigns of the preceding kings mentioned by Keating, in the "tables of the Kings of Ireland" which is given in his history, and which amount to 129, between Heber and Tighearnmas, there results as the date of the arrival of the Milesians in Ireland, 1044 B.C. Going back about two generations from this date, to the arrival of the colony in northern Spain, and their settlement there under Bartha, we have the date of 1200 (approx.) B.C., which fairly corresponds with that which has been assigned to the great famine in Spain.

VII.

THE *DEXTERA DEI* SCULPTURED ON THE HIGH CROSSES
OF IRELAND. BY FRANCIS JOSEPH BIGGER, M.R.I.A.,
F.R.S.A.I.

[Read APRIL 9TH, 1900.]

So far as I can at present ascertain, we have only three examples of the symbol known as the *Dextera Dei*, or Right Hand of God carved upon the high crosses of Ireland, nor have I observed it in any other sculpture anterior to the thirteenth century in this country. It occurs on the Cross of Muiredach at Monasterboice, on the Cross of King Fland at Clonmacnoise, and on the Cross in Kells street. The two former are by far the most remarkable in form and in the position they occupy upon the Cross itself. In each case they are on the underside of one of the arms with the wrist towards the shaft as if to symbolize the Hand of God supporting the Cross; they are distinct and alone, not being connected with any other subject, and represent the full Hand, all the fingers extended. Both are surrounded with ornamental circles or nimbi, that of Monasterboice being more ornamental than the other. Both, however, bear one distinct feature, which is this, they must either represent the palm of the left hand or the back of the right hand, as the thumb is depicted on the left side.

If the latter, which is more probable, then the idea suggested of the Hand of God supporting the Cross is the more apparent, for the arm of the cross leans on the palm of the hand, and the back is exposed to view. We do not consider it was ever intended to represent the left hand.

In the case of the Kells Cross representation, the subject is quite differently treated. To the left is a large bearded figure holding something like a square, below which kneel two figures, the "square" forms a corner in which is the *Dextera Dei*, with the wrist to the upper corner and the thumb and two first fingers hanging down; the other two fingers are closed on the palm as in the act of blessing. It may be added here that the position of the fingers approach more nearly the Greek form of blessing than the Latin form, and there is no nimbus.

This is unmistakably a right hand with the palm exposed to view, and quite different from the other two. The whole scene forms one of the panels on the side of the Cross, but what subject is represented I am unable to say.

As pure symbolism on our High Crosses is not commonly met with, it makes one dwell the more on the extraordinary character and

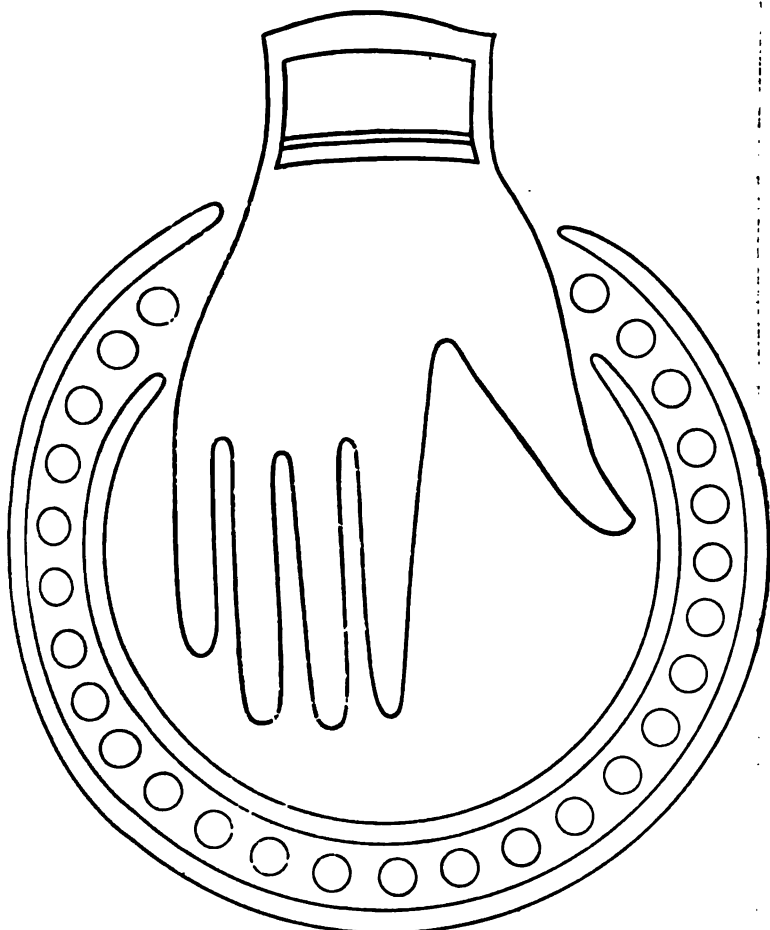


Dextera Dei on the Cross of Muiredach at Monasterboice.

position of the representations here described. So far as I can find, neither in England, nor yet on the Continent, is the symbol usually depicted as at Monasterboice and Clonmacnoise. The Kells figure is the usual one, and it is often met with, particularly on the Continent. The symbol is not recorded from Scotland at all.

The other Christian symbols found are, the Dove at Clonmac-

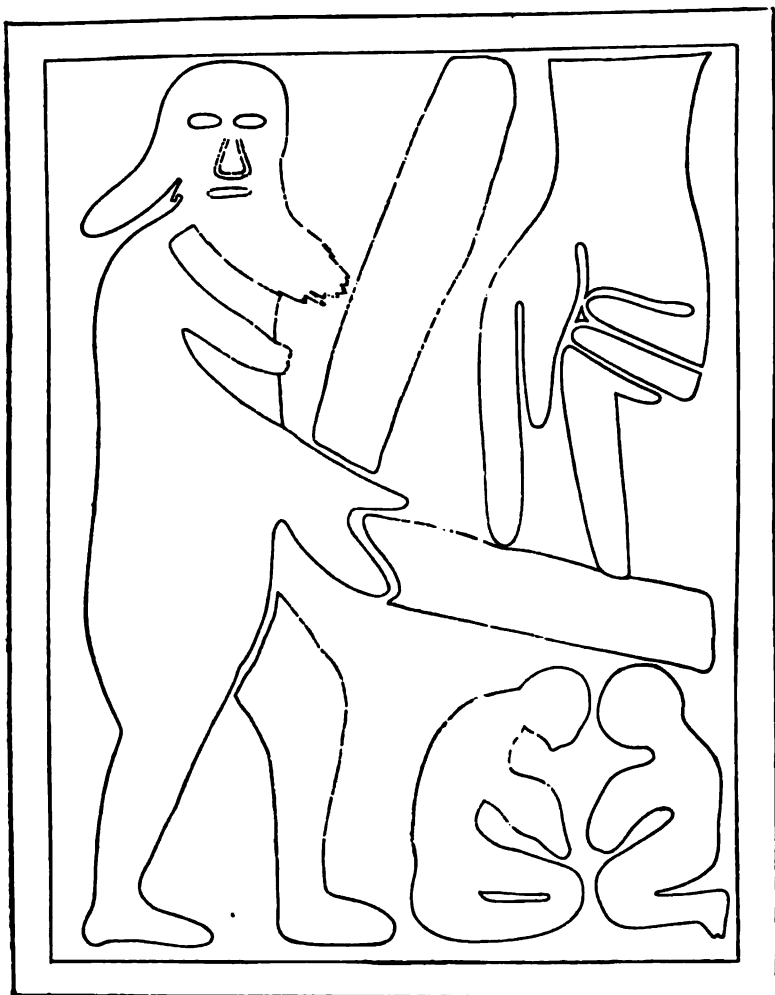
noise; the *Agnus Dei* at Kells and Durrow; the Fish at Kells; the Trinity at Durrow, and the symbols of the four Evangelists at Duleek. There may be others.



Dextera Dei on the Cross of King Fland at Clonmacnoise.

It will thus be seen how very few symbols are cut upon our crosses in comparison with the other European countries, where all the known symbols are recorded times without number, and this brings us to the consideration of the question of the origin of this device. In

Psalm cxviii., v. 16, we read : " The Right Hand of the Lord hath the pre-eminence. . . . The Right Hand of the Lord bringeth mighty



Dextera Dei on the Cross in the Street of Kells.

things to pass." But here the Psalmist was doubtless only using an old-world figurative expression signifying power and strength, whilst Saint Peter says "by the Right Hand of God exalted" (Acts ii. 23).

The Semitic origin of the symbol, however, cannot be denied. Upon an Assyrian obelisk two hands are shown issuing from a solar disk.¹

It appears amongst the Chaldæans.²

According to Lenormant, the celebrated pyramid of Borsippa was called "the Temple of the Right Hand," and one of the names of Babylon was "the city of the Hand of Anu," or, what amounts to the same thing, of "the Celestial Hand."³

The hand uplifted towards the sky is an oft-repeated image on the Ex Voto of Carthage, and even at the present time it is figured on native houses in Palestine and Morocco to ward off evil spirits, and in our own day is used when taking an oath by certain religious bodies. Jews and Mahomedans also swear with uplifted hand, as did many of the early pagan races. Of course we are all familiar with the Old Testament scene of *the hand* writing on the wall at Belshazzar's feast (*vide* Daniel v. 5).

A similar power was believed to remain in the hands of the chieftains of Australia after death, when they were detached from the body and preserved by the tribe; and even in Ireland we find elaborately wrought reliquaries made to contain the hands of saints and holy persons.

A hand also decorates the pedestal of the Holy Tree in a bas-relief at Bharhut.⁴

In these cases the full hand is shown with the fingers extended as at Clonmacnoise and Monasterboice.

The hand almost as often as the eagle surmounted the Roman standard, and in such case symbolised power and triumph.

In a miniature of the ninth century, in the Bibliotheque Nationale of Paris, the Divine Hand is depicted in the centre of a nimbus, with a Cross emanating from the clouds.⁵ This hand is similar to that of Kells in that only the back is shown.

This is the manner in which the hand was invariably shown in Christian times down to the eleventh century, and no other representation of the first person of the Trinity is ever found until after that period.

¹ G. Rawlinson, "The Five Great Monarchs," vol. 2, p. 233.

² Lagard, "Mithra," pl. xxvii., fig. 5.

³ Gazette Archeologique, 1877, p. 31.

⁴ For these references, see "The Migration of Symbols," by the Count Goblet d'Alviella.

⁵ See "Christian Iconography," Sidon and Stokes, vol. i., pp. 55, 202, 204-6, 210.

In "Symbols and Emblems," by Elizabeth Twining, there is an illustrated list of the hand as it appears in various places, mostly in Italy, but one from the Norman Abbey Church of Romsey, Hampshire, approaches the nearest to the subjects of this paper; it appears above the Crucifixion with all the fingers extended downwards, the wrist surrounded by conventional clouds. J. Romilly Allen, in "Christian Symbolism," p. 165, illustrates this also, and gives numerous other instances of the *Dextera Dei*. A hand in benediction appears above a Saint Andrew Crucifixion in the twelfth century seal of Wells Cathedral.

Nowhere can I find any examples similar in form and position to those of Monasterboice and Clonmacnoise, so they may be taken as perfectly unique in Christian art and symbolism. In later years (*circa* 1335) we find the O'Neills of Ulster bearing the right hand as an emblem, the definite origin of which we know not, but we may surmise it to have been to them a sacred symbol of Divine strength and assistance. It may have been brought to Ireland by the Phœnicians. The later myth connected with the bleeding *left hand* must be thrown aside as of recent growth.¹

I wish to express my indebtedness to Miss Margaret Stokes, John Kingcomb, and the Rev. Dr. Healy, of Kells, for assistance in writing this paper.

Since this paper was written and read, "Horns of Honour," by F. J. Elworthy (Murray, 1900) has appeared. It is largely devoted to this subject, and is copiously illustrated, conclusively proving the extremely ancient character of this symbol and its wide distribution amongst the early nations of the world long anterior to Christian times. I had no idea when writing this paper that so many pagan examples of the hand were in existence, or that its veneration had been so universal. It is a most instructive example of the adaptation by Christians of a symbol sacred before their time, and not by any means confined to the Jewish nation. The writer of the book does not, however, refer to the Irish Christian examples I have described, so he was doubtless unaware of their existence.

¹ B. N. F. C. Proceedings, 1892-3, p. 513. "The Red Hand," by John Vinycomb.

VIII.

DOLMENS AT BALLYCROUM, NEAR FEAKLE, COUNTY CLARE. By T. J. WESTROPP, M.A.

[Read APRIL 23RD, 1900.]

NORTH of the village of Feakle, in the ancient district of Tuath Aughty, forming the southern region of the hilly district of Slieve Aughty, between the counties of Galway and Clare, lie three dolmens, the subject of this Paper.¹

They are reached by a road winding up the green slopes of the hills, to the north of the parish church of Feakle, and commanding a fine open view across the plains of Clare to Slieve Bernagh and the Shannon. The parish of Feakle (Fechill, 1302) is not rich in antiquities, and probably the facts of its unusual size, and the absence of any ancient church in the beautiful and extensive valley south of Lough Graney, implies its wild and scantily peopled condition in early Christian times. This evidently continued to later days as is shown by the unusual scarcity of the peel towers, so common in other districts, only one site remaining in the parish which is in extent about 8 miles square. The numerous names compounded of Derry and Durra, lying along the flanks of the hills, tell of numerous and probably nearly unbroken oak forests. Indeed, the district must have been thickly-wooded from the days when huge elks were engulfed in its bogs down to the last century.

Early legend connects the name Aughty with "Echtge the awful," a lady of the Tuatha de Danann, daughter of Nuad Silver Hand,² who was a lover of the cup bearer of Sengann and Gann, the tribal ancestors of the Siol Gangain—the Ganganoi of Ptolemy's Atlas.

Our annalists state that the lake of Lough Graney burst out with numerous other lakes in other places, about 700 years before our era. In the historic period no events of much importance occurred in its borders, and in its few records its loneliness and wildness are usually

¹ Ordnance Survey Map, County Clare, No. 19.

² "Silva Gadelica," vol. ii., p. 126. Caeilte also mentions a place, Cuaille Chepain, south of Lough Graney, where Chepan Mac Morna fell.

mentioned in emphatic language. The "Colloquy of the Ancients" tells of the severe winter when "the stag of frigid Echtge's summit catches the chorus of the wolves."¹ The "Wars of Turlough" again and again relate how the Macnamaras and O'Briens fled to the old woods, when the Clan of Brien Roe and its English allies, the De Clares of Bunratty, proved too strong for them. In 1277, the Macnamaras flee into "Echtge's dense forest and leafy foliage"; it afforded them safety in 1280, and again in the severe winter of 1315, "by Echtge's shortest tracks, in the fast woods they made their close set camp; in this stress and jeopardy, they passed the cold-winded, dark-visaged winter." At last fortune changed, and their enemies in their turn sought the friendly shelter in their wild and harassed retreat under Brian Bawn from Burren to the fords of Killaloe in 1316, "until in Echtge's blue ridges, wind-tormented, cold, and with buttressed sides they found a resting place."

To Echtge's forests Prince Murchad O'Brien and his adherents carried the cattle spoil of the Normans, and from them they made their forced march a few days later in May, 1318, to complete the destruction of the army of Sir Richard De Clare, at Dysert O'Dea.

The rental of the Macnamaras, about 1380, mentions only ten out of the ninety townlands of the parish, and even these lie chiefly round Feakle and Fahy, where traces of ancient occupation occur. Indeed, till the latter half of the last century, no English or Irish families of note seem to have fixed their residence in the lonely valleys; nevertheless, the dolmens and rock-markings of Dromandoora already described in these *Proceedings*, the cists at Corracloon and the townland noted in this Paper, together with a few forts, show that, in very early days, a few adventurous mortals dwelt in the recesses of the forests.

Driving up the pass we get a beautiful glimpse of the distant Lough Graney, the ancient Lough Bo Girre² embosomed in the wooded hills of Caher, and note the blocks of the defaced dolmen of Corracloon rising above the thick furze bushes on the rounded hill to our right. We cross the little mountain stream and winding valley of Glénbonnive, and then ascend the fields to the summit of the ridge, finding a rude track used by turf-cutters which brings us to the boggy basin where these dolmens lie, in the townland of Ballycroum.

This Paper is mainly intended to correct a vague and misleading description, and a fanciful theory set forth in the Ordnance Survey

¹ "Silva Gadelica." "Colloquy of the Ancients," vol. ii., p. 192.

² Silva Gadelica, vol. ii., p. 126.

Letters;¹ this has unfortunately been published by Mr. Borlase² without a personal visit, and owing to its wide dissemination has been quoted, and in one instance has already been used as the basis of a further theory.³ It therefore seems necessary, despite the proverbial difficulty of stopping an error once it gets into print, to supply careful plans and information, and point out the deficiencies of O'Donovan's description and the consequent untenable nature of his theory.

He writes—"Tobar Ghraíne, *i.e.* Grania's well, which is, perhaps, the most curious in Ireland as resembling almost in every particular instance the well called the '*the King of the Waters*'⁴ in the Book of



TOBERGRANIA. FROM THE EAST.

(Altoir Ultach on the mound.)

Armagh. It is situated in the centre of a bog about three miles from the village of Feakle. It is a square well measuring 5 feet every way, and constructed of stones placed on their edges, and covered at the top with a large flag laid horizontally, and measuring 8 feet from the north to the south, and 7 feet 6 inches from east to west, and

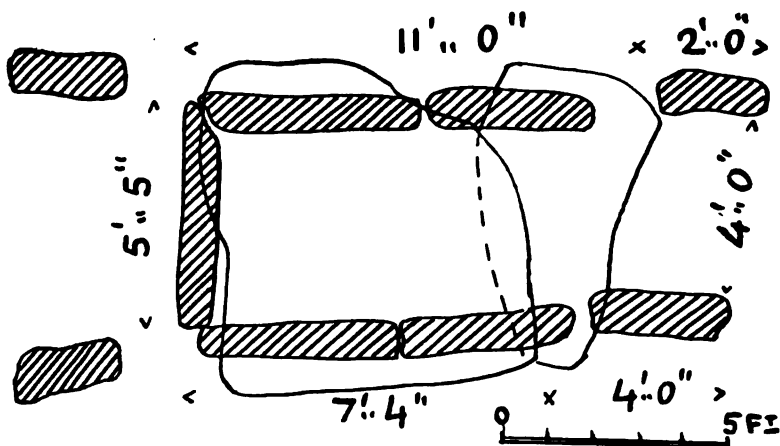
¹ MSS. R. I. A., 14 B 24, p. 156.

² "Dolmens of Ireland," p. 95.

³ *R. S. A. I. Journal*, 1899, pp. 63, 123.

⁴ "Tripartite Life of St. Patrick" (Ed. Whitley Stokes), pp. 122 and 123. The "Rex Aquarum" was four-cornered, and had a square slab on top with a slit.

18 inches in thickness. This flag is of grit, and covers the whole well except a *small hole at the west end*, in which particular it perfectly agrees with the 'King of the Waters,' which was completely covered overhead with a large square slab, excepting in one place where there was a split through which people were wont to drop into the well offerings of gold and silver. Tober grania, though not named after any saint, is much resorted (*sic*) for the cure of sore eyes. There can be little doubt that this was a pagan well worshipped by the Hydro-lators of ancient Ireland. It is strange to find it so near Loch Greine, which seems to have derived its name from heliolatry."¹ He then gives a much more careful and accurate description of Altoir Olltach, "the Ultonian Altar."



Plan of Dolmen of Tobergrania.

O'Donovan must have written from "forgotten memory," judging from his statement that the well is 5 feet square. It is actually a tapering cist of the most ordinary type of the dolmens in this district, with antæ to the west end; it is 8 feet long internally, tapering from 4 feet 2 inches to 3 feet 6 inches eastward; each side is formed of two blocks, and there is a single block at the west end with a semi-circular "scoop" out of the end not unparalleled in other cromlechs in the same county.² These opes may have been "ghost-doors," and may

¹ This view he contradicts a few lines lower down, stating that the lake is named after the district of Grian Echtghe.

² Deerpark and Creevagh, *e.g.*

conceivably have been used for inserting offerings, but their analogy to the hole in the cover of the well of Slan is too doubtful for statement. The holes so common in the sides of Indian dolmens are not of frequent occurrence in our island, and also the fact that at least several of the dolmens with "scoops" were embedded in cairns and mounds renders their use for offerings to the dead dweller in the cist still more uncertain.

There are two top slabs, the western overlapping the eastern, as is sometimes the case in other dolmens; the larger is irregular, its extreme measurements are 7 feet 7 inches north and south by 7 feet 10 inches east and west, and about 18 inches thick. On the lower slab rest a number of offerings of the poorest description—buttons, bottles, broken glass and crockery, and two very rude wooden crosses, left by those who resorted to the "well" for the cure of their eyes.

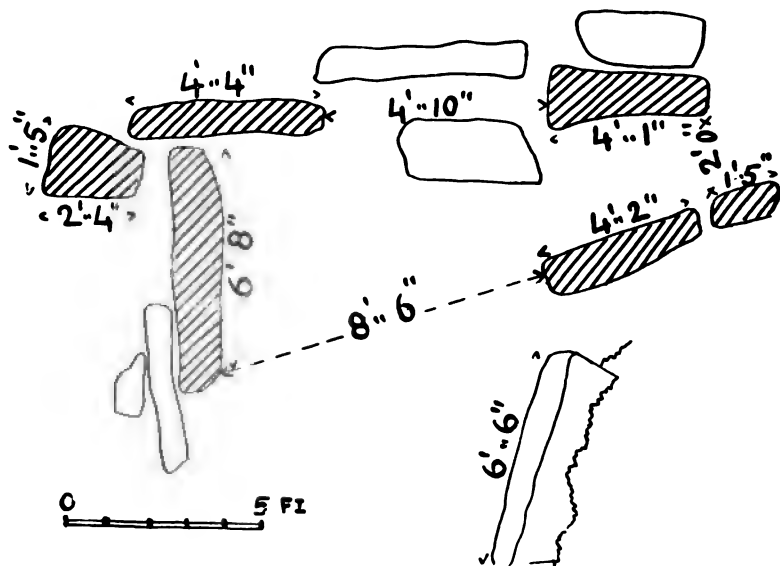
O'Donovan found it in good repute in his day, but its reputation has waned during the intervening sixty years, so fruitful of change in weightier matters in this country, and so destructive of folk-lore and traditional observance. As far as I could learn, a few old and poor people come now and then; but a neighbouring farmer's wife, living less than a mile from the well, though she "had heard people talk about the cures of Tubbergranny," and her own eyes were weak, had never taken the trouble to visit it.

Finally, the "well" has no spring in it. I have visited in a wet summer and in the autumn, and could only detect surface water or mud inside. It used, I hear, to have water at all times, but as the peat gets more and more cut away it is now practically dry at most seasons of the year. No doubt when it was made on its little knoll a few feet above the present surface of the bog the peat was not so high as in later days, and now the older state of dryness is being restored.

ALTOIR ULTACH is still understood by the peasantry to have derived its name from a priest who fled from Ulster to a spot where the penal laws were less powerful, and used to celebrate the Mass on this dolmen, as a fellow-priest used to do on the dolmen of Knockshanvo, on the hill of Knockaphunta beyond Broadford. The "altar" stands on a "saddle" (half way up the slope of one of the curious low rounded knolls which surround the bog) and lies to the west of Tobergrania. It commands a noble view through the gaps between the knolls over the Lakeland of Central Clare,¹ with its bright blue streaks of the Lakes of Cullaun, Kilgorey, Rosalara, and many others lying among

¹ I have counted thirty lakes visible from another hill at Lough Ea.

the woods, while far away lies the lake-like estuary of the Fergus, with its islands and long reaches of the Shannon. On the hummock to the north we get an equally fine view of Lough Graney and its glens and of the distant Lough Derg. Altoir Ultach has, at the north-west corner, a pillar 2 feet 1 inches by 1 foot 5 inches, and 5 feet high. The north side of the structure consists of three slabs (4 feet 4 inches, 4 feet 10 inches, and 4 feet 1 inch long, the middle one displaced). The two eastern blocks of the south side are *in situ*; a gap 8 feet 6 inches long lies between them, and the large western slab, which is 6 feet 8 inches



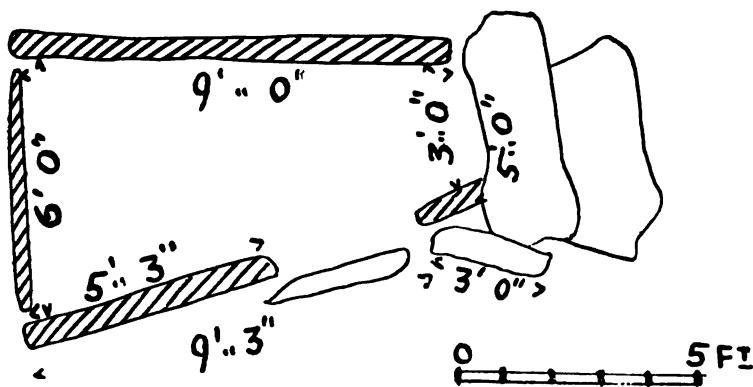
Plan of Dolmen of Altoir Ultach.

long and about 4 feet high. One of the side slabs 6 feet 6 inches long has been dragged out till it lies nearly at right angles to its former position. The slabs vary from 10 to 14 and 16 inches in thickness. The structure is of the usual plan, 14 feet long and tapering eastward from 6 feet 8 inches to 2 feet. The sides, as usual, get lower towards the east, till they scarcely rise a foot over the grassy sward. The roof slabs had been removed before 1839.

"DERMOT AND GRANIA'S BED."—The third dolmen lies almost buried in heather and bilberries not far eastward from Altoir Ultach. It is not noted on the maps or in the Letters of the Survey. It is of

the usual plan, one slab 9 feet long to the north, three to the south, and one to the west, tapering eastward from 5 feet to 3 feet, and about 10 feet long. The covers are gone, and it has been dug up.

Dermot and Grania are locally supposed to be saints. One man thought they had built Feakle church in the old times. Evidently the Ulster priest and the old repute of the well, though it had no Christian dedication, rehabilitated the character of the dolmens and their traditional builders, for their Paganism is forgotten, which is far from being the case elsewhere in the county, and the older people connect them rather with the faith of St. Mochonna of Feakle than with that of the ancient chieftain's daughter, Lady Graney—"who was drowned in Lough Graney, washed down the River Graney, and buried in Tom-graney."¹



Plan of Dermot and Grania's Bed.

A very old herdsman also told me that Grania was one of the *saints* who had built the other "Labbas," and that the "scoop" in the end slab was made by *his* head when *he* drank out of the well.

The name Cahergrania on the key map has no local existence. The nearest trace of a stone fort is found some miles to the north-east on the hill above the trees and rhododendrons of Caher, on the shore of the lonely "Lake of the Sun," in the heart of Echtghe.²

¹ "The Colloquy of the Ancients" mentions this lady as daughter of Finn.

² See Mr. H. Knox's interesting notes on the "dolmen well" of Tobernaholthra in Mayo. *Journal, Roy. Soc. Ant. Ireland*, 1899, pp. 63 and 127.

NOTE ADDED IN THE PRESS.

THE interest shown in the statement as to the occurrence of forest names round Echtghe encourages me to copy from my notes the following list of place names round the southern slopes of those hills:—

Inchicronan Parish.—Derrynagleera, Derrynacrogg, Durra, Derryvet, Derryvinnaun, Derrygoul, Derryhamma, Derryskeagh, Derrybeg, Derryfadda, Derrynarahny, Derrymore (2).

Tulla Parish.—Derryulk (3), Kyleduff, Kylemore, Rosslara, Derrymore (2), Derrybeg, Derrynabrone, Derrykeadran, Derrinterrieff.

Feakle Parish.—Derrynaveagh, Derryfadda, Derrycarran, Dereendooagh, Derricnaw, Killanena, Gortaderry, Crossderry, Derrynaneal, Derrynagittagh (3), Derryabbert, Derryvinna, Derryeaghra, Derrybehagh, Derrygravaun, Derrynaheila, Derryulk Derrywillin, Augha-derreen, Knockbehagh, and Corbehagh.

The names stop abruptly at Feakle Parish, there being none in Moynoe Parish, though it runs for several miles up the hills. One name, Derrycon, is found in Iniscaltra Parish.

Mr. G. Kinahan, on the reading of the present Paper, stated that he considered these dolmens to be slab huts for deer stalkers, and that he found pits near them for the capture of deer. As the cists are identical with those found in cairns, and with others containing buried human skeletons, I see no reason for separating the dolmens from the class which they resemble. We would of course require some definite proof that the "pits" had not been made by turf diggers.

IX.

ON THE REDUCTION OF THE INTEGRAL $\int \frac{\phi(z) dz}{\psi(z)\sqrt{f(z)}}$
TO A NUMBER OF OTHER INTEGRALS OF THE FORM
 $\int \frac{dz}{(z-n)\sqrt{f(z)}}$ WHEN $\phi(z)$ AND $\psi(z)$ ARE RATIONAL AND
INTEGRAL FUNCTIONS OF z AND $f(z)$, A POLYNOMIAL
OF THE DEGREE $2m$. BY REV. W. R. ROBERTS, F.T.C.D.

[COMMUNICATED BY REV. JOHN H. BERNARD, D.D.]

[Read JANUARY 22, 1900].

1. IN the discussion which follows we shall assume that the roots of $f(z) = 0$, which we shall denote by $a_1, a_2 \dots a_{2m}$, are real, and also that the limiting values of z in the integrals treated of are also real. We shall write, then,

$$f(z) = z^{2m} + P_1 z^{2m-1} + P_2 z^{2m-2} + \dots + P_{2m} = (z - a_1)(z - a_2) \dots (z - a_{2m}).$$

We shall now let

$$I_r \left(\begin{matrix} z_1 \\ z_2 \end{matrix} \right) = \int_{z_2}^{z_1} \frac{z^r dz}{\sqrt{f(z)}}, \quad L \left(\begin{matrix} z_1 \\ z_2 \end{matrix}, n \right) = \int_{z_2}^{z_1} \frac{dz}{(z - n)\sqrt{f(z)}},$$

r being an integer, or, simply I_r , and L , when we do not wish to put the elements in evidence.

2. We now proceed to classify the various elementary integrals upon which the general integral $\int \frac{\phi(z) dz}{\psi(z)\sqrt{f(z)}}$ discussed in this paper, can be made to depend.

Let us, in the first instance, suppose that the degree of $\phi(z)$ exceeds that of $\psi(z)$; in this case, it is well known that $\frac{\phi(z)}{\psi(z)}$ consists of a number of terms of the type $c.z^r$, c , being a constant, and of a number

of terms of the type $\frac{c_s}{(s-n)^r}$, c_s being a constant, and r and s integers; if, however, the degree of $\psi(s)$ exceeds that of $\phi(s)$, then terms of the latter type will alone appear.

3. We now differentiate the expression $2s^r \sqrt{f(s)}$, and find

$$2ds^r \sqrt{f(s)} = s^r \frac{f'(s)}{\sqrt{f(s)}} + 2rs^{r-1} \frac{f(s)}{\sqrt{f(s)}},$$

or, substituting for $f(s)$ and $f'(s)$ their values, and integrating between the limits s_1 and s_2

$$\begin{aligned} 2 \int_{s_2}^{s_1} s^r \sqrt{f(s)} \, 2mI_{2m+r-1} + (2m-1) P_1 I_{2m+r-2} \dots + P_{2m-1} I_r \\ + 2r \{ I_{2m+r-1} + P_1 I_{2m+r-2} + \dots + P_{2m} I_{r-1} \} \\ = (2m+2r) I_{2m+r-1} + (2m+2r-1) P_1 I_{2m+r-2} + \dots + 2r P_{2m} I_{r-1}. \end{aligned}$$

By assigning to r successively the values $0, 1, 2, \dots, r$, in the above formula, we learn that all integrals such as I_r , where r is an integer and greater than $2m-2$, depend on $2m-1$ integrals, namely $I_0, I_1, \dots, I_{2m-2}$, which we shall refer to as the $2m-1$ I_r .

4. We now put

$$\chi(s, n) = \frac{f(s) - f(n)}{s - n};$$

differentiating with regard to n , we find

$$(1) \quad \frac{d\chi}{dn} = \frac{f(s)}{(s-n)^2} - \frac{f(n)}{(s-n)^2} - \frac{f'(n)}{s-n};$$

and with regard to s , these results

$$(2) \quad \frac{d\chi}{ds} = \frac{f(n)}{(s-n)^2} - \frac{f(s)}{(s-n)^2} + \frac{f'(s)}{s-n}.$$

Again, we have the identity—

$$d \cdot \frac{\sqrt{f(s)}}{s-n} = \frac{f'(s)ds}{2(s-n)\sqrt{f(s)}} - \frac{f(s)ds}{(s-n)^2\sqrt{f(s)}},$$

and introducing into this the values of $\frac{f'(z)}{z-n}$ and $\frac{f(z)}{(z-n)^2}$ from the equations (1) and (2) we arrive at the formula

$$(3) \quad \frac{d}{dz} \cdot \frac{\sqrt{f(z)}}{z-n} = \frac{1}{2\sqrt{f(z)}} \left\{ \frac{d\chi}{dz} - \frac{d\chi}{dn} \right\} - \frac{f'(n)}{(z-n)^2 \sqrt{f(z)}} - \frac{f'(z)}{2(z-n)\sqrt{f(z)}}.$$

We have denoted the integral $\int_{z_2}^{z_1} \frac{dz}{(z-n)\sqrt{f(z)}}$ by L ;

we have consequently
$$\frac{dL}{dn} = \int_{z_2}^{z_1} \frac{dz}{(z-n)^2 \sqrt{f(z)}};$$

introducing these values into equations (3) after integrating with regard to z , we obtain

$$(4) \quad \int_{z_2}^{z_1} \frac{\sqrt{f(z)}}{z-n} = \frac{1}{2} \int_{z_2}^{z_1} \frac{R(z, n) dz}{\sqrt{f(z)}} - f(n) \frac{dL}{dn} - \frac{1}{2} f'(n) L,$$

where, for the sake of brevity, we have written

$$R(z, n) = \frac{d\chi}{dz} - \frac{d\chi}{dn}.$$

Now $R(z, n)$ is of the $2m-2^{\text{nd}}$ degree in z ; consequently integrals of the type

$$\int \frac{dz}{(z-n)^2 \sqrt{f(z)}}$$

are, by this formula of reduction, shown to depend on the $2m-1$ L , and the integral $L\left(\begin{smallmatrix} z_1 \\ z_2 \end{smallmatrix}, n\right)$.

Differentiating this formula of reduction with regard to n , we readily perceive that the integral

$$\int \frac{dz}{(z-n)^3 \sqrt{f(z)}}$$

depends on

$$\int \frac{dz}{(z-n)^2 \sqrt{f(z)}}$$

and the $2m-1$ I_n , and consequently depends on L , (z, n) and the I_n .

It follows then easily that all integrals of the type

$$\int \frac{dz}{(z-n)^r \sqrt{f(z)}}$$

depend on $L(z, n)$ and the I_n .

All the elementary integrals, then, which can arise in the discussion of the integrals

$$\int \frac{\phi(z) dz}{\psi(z) \sqrt{f(z)}}$$

can be reduced to the $2m-1$ I_n and integrals of the type $L\left(\begin{smallmatrix} z_1 \\ z_2 \end{smallmatrix}, n\right)$,

so that we need only consider these $2m$ forms when we discuss the important question of the proper division of elementary integrals upon which the general integral discussed in this paper depends.

5. If now, in the identity of (4) of Article 4,

$$\int_{z_2}^{z_1} \frac{\sqrt{f(z)}}{z-n} dz = \frac{1}{2} \int_{z_2}^{z_1} \frac{R(z, n) dz}{\sqrt{f(z)}} - f(n) \frac{dL}{dn} - \frac{1}{2} f'(n) L,$$

we let n become equal to a root a_1 , of $f(z) = 0$, it is clear the coefficient of $\frac{dL}{dn}$ vanishes, and we find

$$(1) \quad \int_{z_2}^{z_1} \frac{\sqrt{f(z)}}{z-a_1} dz = \frac{1}{2} \int_{z_2}^{z_1} \frac{R(z, a_1) dz}{\sqrt{f(z)}} - \frac{1}{2} f'(a_1) L_1,$$

where L denotes $L\left(\begin{smallmatrix} z_1 \\ z_2 \end{smallmatrix}, a_1\right)$; from which we obtain

$$(2) \quad L = \int_{z_2}^{z_1} \frac{R(z, a_1)}{f'(a_1) \sqrt{f(z)}} dz - 2 \int_{z_2}^{z_1} \frac{\sqrt{f(z)}}{(z-a_1) f'(a_1)} dz.$$

It is evident that we shall have $2m$ of such equations, as there is one corresponding to each of the $2m$ roots of $f(z) = 0$; and as these $2m$ equations enable us to express the $2m$ L_n , viz. L_1, L_2, \dots, L_{2m} , in terms of the $2m-1$ I_n , it follows that the $2m$ L_n are not independent, but are connected by an equation which is easily obtained by the elimination of the $2m-1$ I_n in the following manner.

6. It is not difficult to see that the highest power of a_1 in $R(z, a_1)$ is $2m-2$, and consequently, if Σ denotes summation with regard to

the $2m$ forms described in the last article, we obtain, by the well-known properties of partial fractions,

$$(1) \quad \Sigma L = -2 \int_{z_2}^{z_1} \frac{1}{\sqrt{f(z)}} = 2 \left\{ \frac{1}{\sqrt{f(z_2)}} - \frac{1}{\sqrt{f(z_1)}} \right\},$$

as is otherwise obvious.

If now we multiply equation (2) of the last article by α , and then sum, we find

$$(2) \quad \Sigma \alpha L = -2(m-1)I_0 - 2 \int_{z_2}^{z_1} \frac{z}{\sqrt{f(z)}},$$

since the coefficient of α^{2m} in $R(z, \alpha)$ is $-2(m-1)$.

It would then at first sight appear that by calculating $\Sigma \alpha^2 L$, $\Sigma \alpha^3 L$, . . . $\Sigma \alpha^{2m} L$, we should obtain $2m-1$ equations sufficient to determine the $2m-1 I$, in term of $2m-1$ independent L , but such is not the case as we shall now show.

7. From the mode of the formation of the function $R(z, n)$ it is easily seen that it cannot contain any term of the form z^n , but the only term whose disappearance is of consequence is $z^{m-1}n^{m-1}$, for it follows from the non-appearance of this term that we are unable to determine I_{m-1} ; and it becomes then possible to obtain another equation connecting the $2m L$, so that, in general, we must regard but $2m-2$ of the L , as independent.

It is impossible consequently to express I_{m-1} in terms of the L , but we can express the remaining $2m-2 I$, in term of the L , and the integral I_{m-1} .

An example will make this more clear. Let us take $m=3$, and write down $R(z, n)$ which is easily found to be

$$R(z, n) = 4z^4 + 3P_1z^3 + 2P_2z^2 + P_3z + n(2z^3 + P_1z^2 - P_2) \\ - n^2(P_1z + 2P_2) - n^3(2z + 3P_1) - 4n^4.$$

Introducing the value of $R(z, n)$ into the formula

$$L = \int_{z_2}^{z_1} \frac{R(z, \alpha)}{f'(z) \sqrt{f(z)}} = 2 \int_{z_2}^{z_1} \frac{\sqrt{f(z)}}{(z-\alpha)f'(z)},$$

we find easily

$$(1) \quad \Sigma L = -2 \int_{z_2}^{z_1} \frac{1}{\sqrt{f(z)}}.$$

$$(2) \quad \Sigma \alpha L = -4I_0 - 2 \int_{z_2}^{z_1} \frac{z}{\sqrt{f(z)}}.$$

$$(3) \quad \Sigma a^2 L = P_1 I_0 - 2I_1 - 2 \int_{z_2}^{z_1} \frac{z^2}{\sqrt{f(z)}}.$$

$$(4) \quad \Sigma a^3 L = (2P_2 - P_1^2) I_0 + P_1 I_1 - 2 \int_{z_2}^{z_1} \frac{z^3}{\sqrt{f(z)}};$$

and since I_2 , that is I_{m-1} , does not enter into (4), we can eliminate I_0 and I_1 from (2), (3), and (4), thus obtaining

$$(5) \quad \Sigma \left\{ a^3 + \frac{P_1 a^2}{2} + \left(P_2 - \frac{P_1^2}{4} \right) \frac{a}{2} \right\} L \\ + 2 \int_{z_2}^{z_1} \left\{ z^3 + \frac{P_1 z^2}{2} + \left(P_2 - \frac{P_1^2}{4} \right) \frac{z}{2} \right\} \frac{1}{\sqrt{f(z)}} = 0.$$

From the two following equations we may determine I_3 and I_4 in terms of I_2 and the L .

$$(6) \quad \Sigma a^4 L = 2I_2 + P_1 I_3 + (2P_2 - P_1^2) I_1 \\ + (3P_2 - 3P_1 P_2 + P_1^3) I_0 - 2 \int_{z_2}^{z_1} \frac{z^4}{\sqrt{f(z)}}$$

$$(7) \quad \Sigma a^5 L = 4I_4 + P_1 I_5 + (2P_2 - P_1^2) I_3 + (3P_2 - 3P_1 P_2 + P_1^3) I_1 \\ + (4P_4 - 4P_1 P_3 + 4P_1^2 P_2 - 2P_2^2 - P_1^4) I_0 - 2 \int_{z_2}^{z_1} \frac{z^5}{\sqrt{f(z)}}$$

and in general it is not difficult to see that we can express $I_m, I_1 \dots I_{m-2}$, in terms of the L ; that I_{m-1} cannot be expressed in terms of these integrals owing to the disappearance of the term $2^{m-1} n^{m-1}$ in $R(z, n)$, and that we can, in consequence, find a new equation of connexion between the L , reducing the number of independent L , to $2m-2$, and that we can express the integrals $I_m, I_{m+1} \dots I_{2m-2}$, in terms of the L , and the integral I_{m-1} .

8. We now turn to the discussion of I_{m-1} .

If we write $\rho^2 = \frac{u}{v}$ where u and v are factors of $f(z)$ of the same degree so that $f(z) = uv$.

We find, on differentiating, $2\rho d\rho = \frac{mJdz}{v^2}$, when J stands for the Jacobian of u and v , and is of the $2m-2$ degree in (z) .

$$(1) \quad \text{Hence} \quad 2d\rho = \frac{mJdz}{v\sqrt{uv}} = \frac{mJdz}{v\sqrt{f(z)}}.$$

or, multiplying both sides of the above equation by v , and dividing by $u + \lambda v$ we obtain

$$(2) \quad \frac{2vd\rho}{u + \lambda v} = \frac{2d\rho}{\rho^3 + \lambda} = \frac{mJ}{u + \lambda v} \cdot \frac{dz}{\sqrt{f(z)}}.$$

Now J is of the degree $2m - 2$ in (z) , and if we take $\lambda = -1$; $u = v$, is only of the degree $m - 1$ in z , and consequently $\frac{J}{u - v}$ consists of a rational part, the highest power of z in which is $2m - 1$, and a number of fractions of the form $\frac{A}{z - a}$, where $z - a$ is a root of $u - v = 0$:

It follows then, by integration, that I_{m-1} depends on I_{m-2}, \dots, I_0 , and integrals of the form $L\left(\begin{smallmatrix} z_1 \\ z_2 \end{smallmatrix}, a\right)$ when a is a root of $u - v = 0$.

What divisions, then, are we to make of, or into what classes are we to divide, all the elementary integrals upon which the integral

$$\int \frac{\phi(z) dz}{\psi(z)\sqrt{f(z)}}$$

depends? Our division must be distinct.

We have already shown that we need only consider the integrals $I_0, I_1, \dots, I_{2m-3}$, and those of the type $L\left(\begin{smallmatrix} z_1 \\ z_2 \end{smallmatrix}, n\right)$ as all others can be expressed in terms of these.

Now it is clear $L\left(\begin{smallmatrix} z_1 \\ z_2 \end{smallmatrix}, n\right)$ is an integral which in general it is impossible to connect with the I_i ; and if we look on $L\left(\begin{smallmatrix} z_1 \\ z_2 \end{smallmatrix}, n\right)$ as belonging to a definite class, we see that we can express the $2m - 1$ I_i in terms of *particular* integrals of the class, and consequently cannot properly regard them as distinct.

Hence we hold that there is but *one* class of integrals to which all others can be reduced, namely the class $L\left(\begin{smallmatrix} z_1 \\ z_2 \end{smallmatrix}, n\right)$.

There are many other properties of these integrals which might form material for another paper.

XX.

THE CHURCHES OF COUNTY CLARE, AND THE ORIGIN
OF THE ECCLESIASTICAL DIVISIONS IN THAT COUNTY.
By T. J. WESTROPP, M.A.

(PLATES VIII. TO XIII.)

[Read JUNE 25TH, 1900.]

IN laying before this Academy an attempted survey of the ancient churches of a single county, it is hoped that the want of such raw material for any solid work on the ecclesiology of Ireland may justify the publication, and excuse the deficiencies, of the present essay. So far as it extends, every care has been taken to secure accuracy, but the subject is so extensive, covering over 200 sites,¹ that it lies perilously open to mistake in every direction. Objection may also be made to the fact that the county, rather than the diocese, has been adopted as the limit; this, however, is necessary to put the ecclesiastical survey on even lines with the lists of other antiquities, and in the case of Clare causes the less confusion that the see of Kilfenora exactly covers the baronies of Burren and Corcomroe, while the Clare portion of the bishopric of Killaloe has so strong an identity in history and topography, as to be treated as a separate division in the united diocese of the Protestant episcopate. The only exception is a small portion with the little church of Kilrush, and the old parishes of Killeely and Kilquane, now given to certain churches in the city of Limerick, and even of these the two latter form part of county Clare. The question of church sites calls for a note—only those are included in which the author has been able to find a record or definite tradition of the existence of a church; the mere existence of an apparent church-name proves nothing, as the Kill may be, and in many cases is, a reminiscence of “the wood,” *coill*, not “church,” *cill*, formerly on the site, or

¹ I may divide these into 104 existing ruins (of these I have examined 92), 13 mere foundations, 30 certain sites, and 38 doubtful buildings and alleged sites, 43 possible sites in graveyards, and some 20 names from records, nearly 250 in all. Well did our writers call the ruling race of Clare “the Dalcassians of the Churches,” for there was a church for every 10 ferts in the district.

in some cases was a mere "killeen," or burial ground for unbaptized children such sites form a separate list. The whole has been based on the maps and letters of the Ordnance Survey checked as far as possible by personal examination.

Apart from the interest attached to our earliest churches and parishes, apart from their value to antiquary and architect, apart even from their importance in ecclesiastical, and even in secular history, they possess in this country another and, in some respects, even greater interest. They form the tide-marks of our early Christianity, as it flooded the heathen lands in the fifth and sixth century; they mark the starting place of our missionaries to other lands, and the foci of that light of learning and religion that shone in the dense darkness that covered the peoples after the fall of the Roman Empire. Lastly, their appended districts have usually preserved, through all political change, the extent of the tribal lands and petty kingdoms as they existed about the year 1100, when more definite shape was given, and limits set to the episcopal jurisdiction. This arrangement in its turn helped to fix such boundaries by the conservatism of the Church.

In the nearly isolated county of Clare—isolated by the river, the sea, and the enmity of Connaught—these phenomena are very apparent, so it is hoped that this Paper may indicate no less the outline of the evangelisation of the district and the ancient tribal divisions, than the number and age of the churches and, where possible, the name and period of their original founders. It must be borne in mind that in most instances, if not in all, the existence of the church preceded its present remains sometimes by several centuries. An energetic outburst of building (as was shown in a former volume of our *Proceedings*) took place between 1390 and 1520, resulting in the erection of hundreds of peel towers, and, as this Paper indicates, it also led to the repair, and still more often the rebuilding, of thirty or forty churches.

The obscure records of our hagiology leave us open to confusion and error, and warn us to use great caution in receiving evidence as to church foundations. A great number of "Lives" of our saints are late rhetorical productions, frequently panegyrics and sermons, written from five to eight centuries later than the time of the holy men they record. Few, indeed, approach in value Adamnan's priceless biography; few precede the Danish wars, and being written, rather to edify the pious than to meet the critical, it would be equally unfair to judge them harshly, or to adopt their testimony unhesitatingly. Yet all must preserve genuine tradition, the solid basis of their ornament; and even the latest must keep some outline of its more accurate

predecessor, "as clouds take the shape of the mountains which they hide and rest upon," so in following their guidance, where minute detail is not involved, we probably take no very warped view of the truth.

The term "Thomond" is not used here in its almost prehistoric meaning of northern Tipperary and north-eastern Limerick, nor in its fullest meaning, when the might of the Dalcassians had added to these the present county Clare, a fragment torn from Connaught. It is used rather as it extended in the critical times of the Tudors, before



Map of Ancient Churches, County Clare.

the vast revolution which so radically affected the topography of Ireland. This arrangement is stereotyped on our maps by the present county of Clare, extended to its natural south-eastern limits of the Shannon by our including the small district given to the city of Limerick.

SPREAD OF CHRISTIANITY IN THOMOND.

St. Patrick, we are definitely told, never preached in the Clare portion of Thomond, and the absence of his name from the ecclesiastical legends and earlier churches bears out the statement. Even if his alleged journey with Caeilte, in the "Colloquy of the Ancients,"¹ was

¹ "Silva Gadelica," vol. ii., "Colloquy of the Ancients," p. 126.

not absolutely mythical, it could only imply a hasty crossing from Cratloe to Lough Graney, and nothing more.

A certain amount of Christianity may have spread across the Shannon from Singland, where the converted prince, Cairthinn, held his Court; but there is no legend of any church founded earlier than by Cairthinn's grandson Breacan. There seem to have been two saints of the name, the younger probably nephew of the elder; indeed, unless there be some confusion in the "Life of St. Flannan," there was a third "Bracanus" living about 650.

The earliest of these men—Breacan, son of King Eochy Baildearg¹—lived late in the fifth century, and was by the oldest traditions stated to be a fellow-worker, if not disciple, of St. Enda, of Aran. Even to this day, an ancient church of great note, in the western part of Aranmore, bears Breacan's name; while another near Lisdoonvarna, bearing the name of Enda, may mark the latter's work in Corcomroe. Breacan probably worked first in Corcomroe, where, by the picturesque waterfalls of Toomullin, stands a late church with a well bearing his name.

Brought into contact with the pagans of the Corcomroes, Breacan probably conceived the idea of founding a mission in the centre of the present county Clare; and with that wonderful genius and power of selection of strategic positions, so generally displayed by the Irish missionaries, he fixed his establishment at a place called Noughaval, in the district of Magh Adhair. It was a low green ridge, not far from the Fergus, and commanding a view across the whole plain of Clare to Burren, Echtge, and Slieve Bernagh; here he built a church, which formed an independent parish of Kilbreacan, down to, at any rate, the fourteenth century. The name is still preserved in two adjoining townlands, but the massive "cyclopean" foundations of the little oratory are now called Carntemple, and the holy well is Tubberdooran. History has justified his choice—all traffic, and commerce, and warfare have since passed by his monastery; the towns of Ennis and Clare, their monasteries, the modern railway and roads, all show how accurately the ancient priest foresaw the advantage of this obscure spot.

To the north-west and north-east of Kilbreacan, he most probably founded two other churches, Doorra and Clooney; at the latter of which he was remembered to the middle of this century as "Rikin,"

¹ For collected account, see *Journal R.S.A.I.*, 1895, p. 252, and Lord Dunraven's "Notes," vol. i., under Temple Breacan, in Aran.

while the former, in 1189, was known as Durinierekin. He was buried in Aran, near the west end of his own church, in a spot now marked by the fragments of a richly-carved cross, and by an early cross-scribed slab with the words, "Sci Dpēcani."¹

The dawn of the sixth century saw Senan,² a scion of a good family which lived at Moylough, near Kilrush, engaged in an extensive work of preaching and teaching in Corcovaskin, and the other districts at the mouth of the Shannon. Men told how, seventy years before his birth, his coming had been foretold by Patrick, who had pointed out the "Green Island in the mouth of the sea," as the abode of the coming saint. Naturally, a deeply thoughtful and religious youth, Senan was forced to take part in a raid into Corcomroe, which seems to have disgusted him with the lay life, and awed him by his own wonderful preservation. His churches on the islands and coasts of the Fergus, the Shannon, and the Atlantic are, with the exception of Scatterry, of little note; and the latter paid for its noble position the penalty of cruel ravage and long occupation by the Norsemen.

About the year 550, the later contemporaries of Senan practically completed the foundation of the early centres of religion throughout the district, Maccreiche, Mainchin, Blathmac; and Luchtighern founded the important churches of Kilmacreehy and Kilmanaheen in the Corcomroes; Rath, in Kinel Fermaic; Tomfinlough, in Magh Adhair; while Iniscaltra and Tomgraney sprang up on Lough Derg, under Colan and Cronan, two otherwise obscure saints.

The next century was marked by the labours of St. Caimin, of Iniscaltra, and by the austere and far-famed Colman MacDuach. At this time (now that paganism was dead, and had nearly vanished) the missionaries of Killaloe—Molua and Flannan—not only worked among their God-fearing clansmen, but made long journeys among the pagans of the Orkneys and Hebrides (640–680), where Flannan left material traces of his visit in the rude boat-shaped oratory on the once nearly inaccessible sea rock, rising above "the Seven Hunters," which are called from him the Flannan Isles.³

¹ Petrie's "Ecclesiastical Architecture" ("Round Towers,") 1845, p. 141.

² There are several "Lives" of St. Senan, some of considerable age, one attributed to his successor Odran: the principal was at least recast in the fourteenth century, as it alludes to the death of Sir Richard De Clare in 1318.

³ See *Journal R.S.A.I.*, 1899, p. 328; also "Vita S. Flannani." I must here thank the Right Rev. Dr. T. M'Redmond, Roman Catholic Bishop of Killaloe, for lending me a copy of this "Life" and other material relating to St. Flannan.

The eighth century saw the rise of one more church of note—Dysert O'Dea. It was founded by St. Tola, who died in 735, but his life-work is rather identified with central Ireland. The Danish wars during the two following centuries seem to have blighted further advance.

DANISH WARS.

Early in the ninth century, we hear of a great slaughter of the "Gentiles," by the men of Munster (813); and Corc, chief of Thomond at that time, is described by Brian¹ as "the man who first routed the foreigners in eight great battles." In 834, the Danish fleet came up the Shannon, and ravaged Corcovaskin and Tradree.² Three years later, Iniscaltra was plundered, but the Dalcais³ defeated the foe in a naval battle on Lough Derg. For a generation we have no further record of raids on Clare, and there was evidently a lull after the death of Turgeis (843); but in 866, Baraid and Amlaffson, with the Dublin fleet ravaged all Mumhan (perhaps Thomond), to Corcomroe and Loop Head,⁴ and slew Cermad, chief of Corcovaskin. Twenty years later, Tomgraney was ravaged by the Danes. In 908, Tomrar Mac Elge,⁵ the Danish King of Limerick, attacked Iniscaltra and Muckinish on a raid to Clonmacnoise. In 916, there was another great raid, but the men of Corcovaskin joined the men of Kerry, routed the foreigners, and slew "Rot, Pudarall, and Smuralt," their leaders. Despite their severe defeat at Singland (close to their city of Limerick), by Callaghan, King of Cashel, the foreigners attacked Iniscaltra, in 922, and "drowned" its relics and shrines—let us hope these may some day be recovered from the safe keeping of Lough Derg—they also plundered the other churches on the lake; and in 969, Tomgraney was again destroyed.⁶ In 964, the men of Thomond suffered defeat and great slaughter in a naval fight on the Shannon; though Brian ravaged the Danes from Lough Derg to the Fergus, and all Tradree. At last fortune turned in the year after the death of Cormac Ua Cuillen, the restorer of Tomgraney Abbey (964). Mahon, King of Thomond, and his brother Brian, gained the victory of Sulloghoda, and took Limerick; and in 977, Brian reduced the Danish settlements along the Shannon in Tradree, Inismore, and Inisdadrum.

Cormac Ua Cuillen, the Abbot of Tomgraney (950–963), King Brian Boru (980–1014) and his descendants, Murchad (1080–1100),

¹ "Wars of the G. and G.," p. 67.

² *Ibid.*

³ "Chron. Scotorum."

⁴ *Ibid.* ⁵ "Annals Inisfallen."

⁶ "Wars of the G. and G.," p. 39.

and Donald More O'Brien (1170–1194), all took a leading part in re-edifying and re-founding churches, schools, and monasteries and their work with the great outbreak of castle and church building in the fifteenth century has furnished most of the ancient church remains noticed in this Paper.¹

LIST OF THE PATRONS AND FOUNDERS OF CHURCHES.

The list of patrons and church builders in this county, during the period from 450 to 750, extends to over sixty names, nor can I satisfy myself that it is in any way complete. Owing to difficulties of identity and date, they are arranged alphabetically, not chronologically.

ACCOBRAN of Kilrush, January 28th (O, pp. 29–39) or 29th (D).²

AEDAN of Iniscatha, stated to be the famous saint of Lindisfarne, August 31st.³

If so, Bede records his death in 651. The *Leabar Brecc* identifies Inis Medcoitt with both Scatterry and Lindisfarne, but the matter is very doubtful.⁴

*BANAWLA or MANAWLA, supposed to be Tola, of Dysertodea; legendary name attached to the high cross, sometimes "Monalagh."

BLATHMAC of Rathblamaic, father of Onchu, supposed Blathmenus of "Vita S. Flannani," c. 640, or Blathmac, friend of Macreehy, c. 550.

BRECAN of Kilbrean,⁵ May 1st, son of King Eochy Baildearg, 440; living, c. 480; shared Aranmore with Enda, and founded churches of Noughaval or Kilbrean; Clooney, near Quin and Doora; wells at Noughaval and Toomullin.

BRECAN, nephew of the last, and cousin of Diman; probably commemorated October 12th, c. 520.

BRECANUS, a contemporary of S. Molua and Flannan, c. 640.⁶

BRENDAN (of doubtful identity), has wells in Kilmoon Parish, and at Farihy in Kilfearagh.

BRENDAN, of Ardfert, A.D. 550, had a church at Inisdadrum.

¹ "Ann. Four Masters."

² Names marked by an asterisk are female. O = Calendar of Oengus, D = Martyrology of Donegal.

³ O, pp. 126–135.

⁴ *R.S.A.I.*, 1897, p.

⁵ His feast-day in Aranmore was May 22.

⁶ "Vita S. Flannani."

BRENDAN MAC FINLOGA resided at Dubhdoire or Doora.

*BRIDGET, daughter of Conchraid, of the family of Mactalius, was Abbess of Feenish, *c.* 550;¹ she is possibly Patroness of the wells at Kiltanon, Cappafeean, Finn timer (in Ibrickan), and Coney Island.

CAIMIN of Iniscaltra, son of Dima, of the race of Cathair Mor, and half-brother of King Guaire Aidhne; churches of St. Caiman, at Iniscaltra, Moynoe, and perhaps Kilcameen, near Kilfenora, died March 25th, 653 (Colgan) (O).

CAEIDE of Kilkeedy church and well, March 3rd; perhaps also of Kilkee (Cil Caeide).

CALLAN of Iniscaltra, August Quart. Cal. (D).

*CANNARA of Kilconry, visited St. Senan, and was buried on Iniscatha.

CARITAN of Kilcredaun church in Moyarta, a disciple of Senan ("Vita S. Senani"), wells at Kilcredaun, near Carrigaholt; at Kilcredaun, near O'Brien's Bridge; and Kilcredaunadober, near Cratloe; living *c.* 550.

CARROL, of Kilcarroll, near Kilrush, where his well, "laght," and wooden image remained in 1816.

*COCHA of Rossbenchoir; nurse of St. Kieran.

COLAN of Iniscaltra, well at Tobercolan, died at Tomgraney, 551 (Annals Four Masters), October 24th (D).

COLMAN MACDUACH of Kilmacduach, half brother of Guaire Aidne, and (through their mother) a descendant of Dathi. Colman studied in Aran, and lived a recluse life at Kinallia, Slieve Carran, and Oughtmama; wells at Teernea, Lough George, and near Crusheen. He founded Kilmacduach about 610; his mediæval "Life" is extant; he died at Oughtmama 29th October, 632. He gives his name to Macduach's river in Clooney Parish, near Quin.

COLMAN of Clonrush.

COLMANS the three, of Oughtmama churches and well and Glenslead well.²

COLUMBA of Glencolumbcille, probably the famous saint of Iona, who is the traditional founder of Crumlin, after leaving Aran, June 9th.³ Another tradition connects him with Iniscaltra; he died at Iona 597.

¹ "Vita S. Senani."

² "Leabhar Breac," p. 21.

³ O, p. 93.

COMAN. There was a Comman out at Arran, November 21¹; his son Colman, November 21,² was also a saint.

*CONANDIL, sister of Senan.³

CONNELL of the lost church of Kilconnell, on the Fergus (will of King Cormac, of Cashel, 902).

CORNAN, of Kilcornan, near Ennistymon, and Tobercornan, near Ballyvaughan.

CROINE, patron of Kilcroe Church and well at Liscrena.

CRONAN of Tomgraney,⁴ October 24th, *c.* 505; November 1st.⁵ He or the second Cronan was also patron of Inchicronan and Termoncronan. The wells at Killokennedy Church and Corrakyle are dedicated to a Cronan.

CRONAN of Tomfinlough, the Leabar Brecc identifies him with Cronan of Roscrea, April 28th.⁶

CUANNA of Kilshanny, perhaps Mochunna (the abbot Covanus) of Kilquane⁷ and Feakle.

DIOMA of Kildimo, near Kilrush, perhaps Diman, nephew of Aenghus, son of Cairthinn Fionn.

*ELIA of Killeely, sister of St. Mainchin, *c.* 550.⁸

*EMERIA, *see* Imer.

ENDA of Aran, son of Connall the red, was granted Aran by his sister's husband, Engus, King of Cashel; founder of the church of Killeany, in the Burren; March 21st,⁹ *c.* 480: *see* his "Life" in Colgan.

FACHTNAN of Kilfenora, perhaps of Ross, as the same saint's day, August 14th, was observed at both places (D).

FINGHIN of Quin, perhaps Finghin of Roscrea, February 5th (D), o Finghin of Clonmacnoise, whose coarbs were connected with Tomgraney.

FLANNAN of Killaloe, son of King Torlough; his Latin Life is preserved; he preached in the Hebrides, and gave his name to the Flannan Isles there; living *c.* 680, December 19th.

*IMER, or Emerica, of Killimer.

¹ O, p. 164.

² O, p. 170.

³ O, p. 62.

⁴ D, p. 279.

⁵ O, pp. 162, 167.

⁶ O, pp. 70, 76.

⁷ White mss. 1658.

⁸ Killeely, in county Galway, is, however, named from St. Faola, daughter of Aedh Draicnigh. Her day was May 3 (Colgan).

⁹ O, pp. 57, 64.

***INGHEHAN BAOITH** of Kilnaboy, March 29th,¹ December 29th; wells at Kilnaboy, Commons, Glensaleade, Quakerstown, Killavella, Dulick in Templemaley, Kiltachy, Kilshanny, Aglish, Moy Ibricane, Magowna, Ballycoree, Shallee (two), Cullaun, Castle-town (Clooney), Drumumna and Quin.

Perhaps daughter of Mobaoi, of Cluan Fhionnabhair (Clooney of Kilfenora), December 14;² his mother was of Loop Head. A certain "Columb inghen Buiti," March 23rd, is named.³ Ethne and Sodelb, daughters of Baoith, founded Donabate Church, in county Dublin.

***ITA** of Killeedy, January 15th, living 551.⁴ She is alleged to have founded a church in Southern Clare.

KIERAN of Kilkerin, Clonderlaw, locally "Keereen," wells there and at Kilnasoola. Perhaps of Clonmacnoise.

LAUGHTEEN of Kilnamona, church and well, and the wells at Kilfarboy and Stacpoole's Bridge, near Miltown Malbay; the reliquary of his arm was preserved at Kilnamona for some time,⁵ and thence sent to Lislachtin, Kerry. He is most probably Lachtin, friend of St. Senan, *c.* 550,⁶ and gave his name to Autkeenlaughteen at Kilnamona.

LOWAN of Killaspuglonan; also of Killilagh and Clooney (in Kilfenora) church and wells, and Derrynavahagh well in Kilmoon Parish. A friend of Maccreehy,⁷ *c.* 550.

LUCHTIGHERN, son of Cutrito,⁸ of Tomfinlough, and perhaps of Inisdimain (Ennistymon, or Moy Inisdia). A friend of Maccreehy, *c.* 550,⁹ April 13th, as kept in parish in 1839. April 28th, in Calendar of Oengus.¹⁰

MACCREEHY, Maccreiche, or Maccreeius, of Kilmacreehy, a disciple of Ailbe of Emly, who died 540, having lived to an advanced age, founding Kilmacreehy, Kilmanaheen, and Inagh churches, about 580. April 11th (D): his curious Latin "Life" is extant.

¹ O, pp. 58, 65, Dec. 29th at Kilnaboy.

² D, p. 335.

³ Colgan, *Act. SS.* 111, and D, pp. 86, 87.

⁴ Tighernach.

⁵ Bruodin's "Propugnaculum Catholicæ veritatis."

⁶ "Vita S. Senani."

⁷ Vita S. Maccreeii.

⁸ See O'Hanlon's "Lives of the Irish Saints," iv., April 28th; "Martyrology of Tallaght and Bollandists"; "Act. SS." iii., p. 546; "Martyrology of Donegal," pp. 112, 113. He was pupil of Ruadhan, of Lorrha (Colgan), "Act. SS.," 13th March; "Life of Maccreehy," xx. and xxi.)

⁹ Vita S. Maccreeii.

¹⁰ P. 77.

MAINCHIN of Kilmanaheen, a disciple of Maccreehy, *c.* 580. Perhaps the Bishop of "Luimneach," now known as St. Munchin, and Manchenus.

MOBAOI of Cluain Fhionnabhair (probably Clooney, in Kilfenora); his mother came from Loop Head; December 14th.¹

MOCHONNA of Feakle, well at Moynoe, "Mochonna of Magheo," March 29.² Perhaps the Abbot Covanus of Kilquane.³

MOCHULLA⁴ of Tulla, in eastern Clare, wells at Lough Graney, Lough Bridget, Tulla, Kilgorey, Fortanne, Broadford, Trough, Ralahine, Miltown (Tulla), Cragg, Lahardaun, Cappavilla, Carrigaholt, Scatterry, and Moylough. Perhaps the "Molocus" of Inistibraid, a friend of St. Senan.⁵ If so, living *c.* 550. Was remembered as a bishop at Tulla.

MOEUA⁶ of Noughaval (perhaps of Kilmoon, Kilmugown, 1302, but name is difficult), wells at Noughaval and Moy. Perhaps Mochua or Cronan.⁷

MOLUA, also Dalua, Lua, and Lugad, of Killaloe. Abbot and Patron of Kildalua, *c.* 640, also of Friars' Island, and probably Killue (Killuga, 1302), Killofin (Killugafion, 1302).

MORONOC of Inisloe, the penitentiary, a friend of S. Senan, *c.* 550.⁸

ONCHU of Killonaghan, probably the son of Blathmac,⁹ whose remains were laid with those of Finan in a "Sepulchrum religionis" at Clonmacnoise.

RICIN and **REKIN** of Clooney, *see* Breacan.

RUADHAN of Lorrha,¹⁰ some think of Ruan. April 15th,¹¹ died 584.

¹ "Martyrology of Donegal," p. 335.

² D, p. 89.

³ Rev. Jasper White's MSS., 1658.

⁴ St. Mochulla's Day, March 23rd (D, pp. 84, 85). Two virgins named Mocolla, on 25th March and 25th May (*Ibid.*).

⁵ "Vita S. Senani," p. 537.

⁶ Mughain, virgin of Cluain Boirenn, December 15th, is named in "Martyrology of Donegal."

⁷ O, p. 112.

⁸ "Vita S. Senani."

⁹ See "D," July 9th, and "Martyrology of Tamlacht," Feb. 8th.

¹⁰ Colgan. Some state that the Stowe Missal and its beautiful case belonged to Lorrha. Ruadhan's bell is in the British Museum.

¹¹ O, p. 85.

SANCTAN of Drumlaigill, in Tradree (Dromline, Drumligil, 1302), son of Samuel the low-headed, and Dectir, daughter of Muredagh Muingdearg. May 11th.¹

SCREABAN (? Sribanus, 1302) of Clondegad, wells there and at Anna, Clondegad.

SEANACH of Kilahanny. Probably brother of Senan, *c.* 550, and of the Magharees, Co. Kerry.

SENAN, son of Gerchinn of Moylough, born late in the fifth century; died 553. Several early lives are extant. He was of Iniscatha (Scattery), Moylough, Iniscaorach (Mutton Island), Inisloe, Feenish, Inismore, Doonass (Kiltinanlea), and Ross (Ros an airchail). Besides these churches and wells, he has wells at Scattery, Kilclogher, Carrow, near Kilmacduane, Erribul (in Kilfeddan), Kilahanny, Killaneena, near Clonlea, Cooraclare, Kilclogher, Drim, and Kilcredaun; he is also the traditional founder of Kilmihil Church. March 8th.²

SEMLY of Kilseily church and well, an unknown saint.

SEKLAN of Iniscaltra, a contemporary of St. Caimin, died May 4th, *c.* 650. Perhaps also of Terryglas. May 26th.³

TOLA of Dysert Tola (Dysert O'Dea), son of Donchad, of the race of Corbmac, died March 30th, 734 or 737. He was Bishop of Clonard and Disert Tola, in the Upper Cantred of Dalcais.⁴ His crossier is preserved. He was probably founder of Kiltoola.

VOYDAN or **BAIGHDEAN** of Kilvoydan, graveyard, well, and cross near Corofin, and Kilvoydan graveyard, well, and bullaun near Kilraughtis.

ORIGIN OF THE ECCLESIASTICAL DIVISIONS.

Divided as Thomond was between three great groups of tribes—whom we may roughly name the Dalcassians, the Corcomodruadh, and the Corcovaskin—it is not wonderful that in early times it was divided into three tribal bishoprics. These, in later days, had their seats at Killaloe, Kilfenora, and Iniscatha, or Scattery; the last had probably been the seat of a bishop from the time of Senan, in the earlier half of the sixth century, and the first was founded by Flannan near the close of the seventh century; the history of Kilfenora is hidden in mist.

¹ O, p. 85.

² O, pp. 56, 62.

³ O, pp. 61, 90.

⁴ O, pp. 58, 66.

The Synod of Rathbreasail,¹ about 1112, made provision for a new arrangement, by which it would appear that it wisely intended to establish one bishopric over all Thomond. It appointed, as bounds to the enlarged see of Killaloe, limits from Slige Dala to Cuchullin's Leap, at Loop Head, and from Mount Eachtúige to Vide an Ríogh (a summit of the Cratloe Hills, at Glennagross, near Limerick, and from thence to Glen Caoin, in Tipperary, which does not concern our present county Clare. The neighbouring sees were thus bounded where they touched the bishopric of Killaloe:—Clonfert by the Shannon, and along Eachtúige to Buirenn—Limerick from Tairbert, on the south bank of the Shannon, to Cuinche, in Thomond, to the cross² on Mount Uidhe an Ríogh, and to the Dubh Abhainn, or Blackwater, a little stream running into the Shannon not far above Limerick.

This amalgamation resulted, in about 1189, in the addition of the Corcovaskins and Ibrikan to Killaloe on the death of Aedh O'Beaghain, the last bishop of Iniscatha; but the Island Cathedral of the lapsed diocese was given most unwisely to Limerick.

This has been contradicted, and a suggestion made that the entries in the "Black Book of Limerick" relating to Iniscatha as in that see, are forgeries.³ No satisfactory proof of this statement has hitherto been given, while several facts seem to tell in favour of the received history. Two undoubted entries in the Black Book are to this effect:—**xxi.** Hubert, Bishop of Limerick (1222, 1250), grants the church of St. Mary of Iniskefty⁴; and, **xxii.**, the Abbot of St. Senan (*temp.* Wm. de Burgo, Deputy-Governor, *c.* 1310),⁵ holds half Iniscathy, with its appurtenances. This being evidently a document preserved as affecting the interests of the see of Limerick.

Yniskeftin (Yniskettin, Yniskestin), in the Papal taxation of 1302, is given in the deanery of Rathkeale and diocese of Limerick; Iniscatha not appearing among the full and careful list of the parishes of Corcovaskin. The Rev. Mr. Dowd⁶ identifies this place as Askeaton; but the latter, in early Irish entries, is Eas Gephtine and Eas Goph-tiny,⁷ while in any early records known to us from English sources it is usually Asketon, or by error Askelon. Nor is there any evidence of

¹ Keating's "History of Ireland" (O'Connor's edition), p. 101.

² Whence Glennacross.

³ *R. S. A. I. Journal*, 1874–5, pp. 257, 259, 273.

⁴ The Church of Scatterry was in later days dedicated to the Virgin: see O'Hanlon, vol. III., March 8th.

⁵ See Patent Rolls, Ed. II.

⁶ "County Limerick."

⁷ "Older Annals, Innisfallen."

an "abbot and convent" existing at Askeaton in the thirteenth century, while the Abbey of Scattery was old and famous. In 1408, Alanus Linsius, or Lynch, "*custodem ecclesiæ collegiatæ de Iniscathy, Limericen: dioc.*" is mentioned;¹ this being an independent and apparently indisputable proof.

Finally, an ancient visitation, probably of the time of Bishop O'Dea (1410), copied by the Rev. Jasper White in the later seventeenth century, gives both Iniscatha and "Asketin, Asketton, or Ascetiny," as in the Deanery of Rathkeale.²

The name Inisketty and Iniskefty occurs for Iniscatha in post-Reformation documents, and even such barbarous corruptions as "Innis-cartts" and "Cathay" occur.

We may suppose that the independent spirit of the tribes of Corcomroe prevented the fusion of Kilfenora for a long time; but, in the end, "Wisdom was justified of her children," and the design of the legislators of Rathbreasail was carried out in the later seventeenth century, when the impoverished see of Kilfenora³ was annexed in turn to one or other of its richer neighbours.

The Isles of Aran were anciently part of the bishopric of the Corcomroes, but were not included as part of it in 1302, and they could not be recovered by Bishop Rider in 1615. It is even possible that Corcomroe was in the bishopric of Aran in the later fifth century, and perhaps the sixth; but, if so, no records remain. The islands lie out of the scope of this Survey.

We must note that, in about 1194, Thomond is defined by Macgrath (*c.* 1350)⁴ as extending "from Cuchullin's famous Leap to Beal Boruma (the ford near Killaloe), from Birra (Parsonstown) to Knockaney, and from the Eoghanacht of Cashel to the northernmost part of Boirinn of white stones." This, save for a small portion annexed to the see of Limerick, corresponds to the present sees of Kilfenora and Killaloe.

THE ENGLISH PERIOD.

The interference of the early English in church matters in Thomond had altogether little effect, and that merely for a time. Robert Travers, put into the see of Killaloe by the influence of his uncle, Geoffrey de

¹ Document in Brady's "*Episcopal Succession*," vol. iii., p. 53.

² Lenihan, "*Limerick: its History*," &c., p. 563.

³ It was worth between £5 and £6 in 1302, and in Elizabeth's reign.

⁴ "*Wars of Torlough*."

Marisco, and the connivance of Donchad Cairbrech O'Brien, Prince of Thomond, was expelled for simony in 1226.¹

The advowsons of certain churches granted to Thomas Fitz Maurice were surrendered by him to "the King of O'Cassyn" (Ui Caisin, *i.e.* to Macnamara); they lay in Oblyt (ui mbloid), and covered also thirteen townlands in Corcomroe, 1311.² Thomas de Clare, at his death, in 1287, held the advowsons of ten parishes, which, from the lands mentioned, exactly correspond to the rural deanery of Tradree with the addition of the church of St. Finghin, at Quin.³ The churches at Quin and Tomfinlough alone show signs of the English builders of this period.

The papal taxation of 1302-6⁴ is, however, the earliest detailed Survey, and is one of the most important lists of the Irish sees and their parishes. On studying it, we find that Kilfenora has evidently not altered in extent, but Killaloe has overspread Tradree to the Shannon. We note that the parishes of Toomullin, and perhaps Oughtdarra, have since been amalgamated with Killilagh, while in the see of Killaloe there were parishes now forgotten at Killargenayn,⁵ Mukan, and Danganbrack; but their churches have vanished without leaving a trace. The mysterious Eribanub is, perhaps, Sribanus, the patron saint (Screabain) of Clondegad, which it follows in the list. Cnoc has been replaced by Kilmurry MacMahon, and Collebonoum by Kilmurry Ibricane, Kiltoola has merged into Inchicronan, and Killoe and Kilbrecan have become Clare Abbey Parish; Inisdadrum has been joined to Killadysert, while Kilfintinan, Killeely, and probably Scatterry, were then in the diocese of Limerick. The three Kilmurrys, Kilmihil, Kilchrist, O'Brien's Bridge, Kiltinanlea, and Kilnoe, have apparently sprung up since 1302; indeed, it is almost a commonplace that the earlier churches were called, as a rule, after their founder and not after scriptural persons. The 1302 taxation exhibits a grouping which may be accidental, but is so peculiar that it may represent either deaneries or some division adopted in the inquiry, and it is worth noting.

¹ *Journal R.S.A.I.*, 1893, pp. 190, 191. Calendar of State Papers, Ireland.

² The oldest of our Irish rolls of Edward II. The earlier ones were most unfortunately burned in that century.

³ "Cal. of State Papers, Ireland, Inquisition, 1287."

⁴ Exchequer Rolls, Cal. of State Papers relating to Ireland.

⁵ Perhaps Killerk, as lying between Kilmaley and Clare Abbey, though we find a Kilourg Lonayne in 1584; but this was in Corcomroe. John King held the Hospital of Killarge, in Co. Clare, 1 quarter with Inisdia (Moy, near Lehinch), Grotneheid and Inchnebooly, 21 Eliz., April 21st, 1579.—MSS. F. 4, 25, T.C.D.

FYNNABORENSIS.—Clonurpis (Clooney); Kilsanyg (Kilshanny); Kilman kyn (Kilmanaheen); Killesconolan (Killaspuglonane, not “Killonaghan”); Kilmaccrik (Kilmacreehy, not “Kilkoony”); Killadlagh (Killilagh); Killeenyarny (not “Killeney”); Dissert; Wafferig; Glaniednagh or Gleneidnagh (Gleninagh, not “Glainafuagh”); Carne (Carran); Drumcruth (Dromcreehy); Chapel of the Monks (Corcomroe); New Church (Noughaval); Kilcorny (Kilcorney); Killenny (Killeany); Kilmugoun (Kilmoon); Rath (Rathborney); Killoncan (Killonaghan, not “Monkalvel”); Cromglaon (Crumlin); Thuomlynnny (Toomullen); Kiltocowragh (Kiltoraght).—Total value, £60 3s. 4d.¹

LAONIENSIS.—The first portion commences on the bounds of the see of Limerick and passes up by Slieve Bernagh to Lough Derg—Kilfyniti (Kilfinaghta); Clonileg (Clonlea); Kellsodidilun or Kellsodielilu (Kilsely, not “Killaloe”); Kellokennedid (Killokennedy); Kellduibrayn (Killuran); Fichell (Feakle); Thomgreney (Tomgraney); Mago (Moynoe, not “Quin or Ennis or Monaster, county Limerick”); Inysgeltra (Iniscaltra); Clonoruis (Clonrush, not “Clooney, near Quin”).

The list then comes down the Shannon to Castleconnell, and gives parishes in county Limerick, and as far as Nenagh, in county Tipperary; then suddenly begins at Kilkeedy, on the northern limit of Inchiquin, and goes southward along the western bank of the Fergus; thence down the Shannon and up the sea coast, so as to cover—1, Inchiquin; 2, Islands; 3, Clonderaw; 4, Moyferta; and 5, Ibricane. 1, Kellquydi (Kilkeedy); Killinbynech (Kilnaboy); Rayth (Rathblamaic); Disert (Dysert O’Dea); Kellnymuā (Kilnamona); 2, Drumleb (Drumcliff); Kellmaley (Kilmaley); Kellargenayn (not “Killard or Atlantic”); De Forgio (Clare Abbey); Clondagah (Clondagad); Eribanub; Disertmurthill (Killadysert); Kellfidayn (Kilfidan); Kellugifoun (Killoffin); Cnoc (Knock in Kilmore); Killadmyr (Killimer); 4, Kellroys (Kilrush); Kellmolihegyn (Kilballyowen—eogain, not “Kilmurry”); Kelliheeneragh (Kilfieragh); Kellarda (Killard); Collebonoum (not “Kilballyowen”); 5, Kellenfearbreygy (Kilfarboy).

The Survey then springs back to the heart of Clare, and goes round the upper baronies of Bunratty and Tulla:—

Inalli (Temple Maley, not “Inagh”); Kilrathusa (Kilraughtis);

¹ The incorrect identifications of the “Cal. of State Papers” call for notice; a Clare topographer must plead ignorance of the existence of Kilkoony, Monkalvel (perhaps Noughaval), Atlantic, &c. among the churches of Clare.

² “Irish Exchequer Rolls,” E. II. 3 d.

Mukan, Kelbrakayn (Kilbreckan); Kellsuvlig (Kiltoola); Inche-gronayn (Inchicronan); Cluony (Clooney); Dubdery (Doora); Clonchi or Chinchí (Quin); Dangynbrecach (Danganbrack); Tulagh (Tulla); Kellugida (Killoe); Thonmynloka (Tomfinlough). Total value £128.

Next, and lastly, the Survey gives a little group of parishes in Lower Bunratty, with the Island of Inisdadrum in the Fergus:—

Kellomsleach (Kilnasoolagh); Kellmalitrie (Kilmaleery); Kellthomry (Kilconry); Inisdadrum (Coney Island); Clonekill-hany (Clonloghan); Drumligil (Dromline); Fudnach (Feenagh); and Bunrath (Bunratty).¹

LIMERICENSIS.—We select, as now in Clare, Kilheil (Killeely); Kilhyntena (Kilfintinan); Kilcohan (Kilquane); and Kilrussece (Kilrush or Old Church).²

We might expect some allusions in the unusually full records of the "Wars of Torlough," but except on three occasions (and those, as befitted their calling, burying the dead or interceding for a prisoner) the monks and clergy never appear. The only religious edifices named in Clare are the monasteries of Corcomroe, 1268 and 1317; Clare, 1278, and Ennis, 1306, and the churches of Moynoe (the chief sanctuary of the O'Gradies), 1310; Tulla nan apstol, and the Termon of St. Cronan (Tomgraney), 1313; the Ascetics' Church of Killmic uidonain at Leanna, 1317, and St. Finghins at Quin, 1318.

The Annals from 1350 give a few dates of foundations or repairs of some of the monasteries and churches (these are given later in this paper), and a few details of their history, but otherwise give us little specific help. An incidental letter published by Theiner³ shows that in 1462 a church existed at Cluaynlard or Clonlara. This silence is the more disappointing that nearly complete rebuilding was effected during the fifteenth and early sixteenth century in the case of at least thirty-three churches, those of Dromcreehy, Carran, Killeany, Kilmoon, Rathborne, Kilshanny, Killilagh, Toomullin and Kilmacreehy, in Kilfenora, and of Kilkeedy, Kilraghtis, Ruan, Templenadeirka, Coad, Kilnamona, Kilmaley, Clonlea, Killokenedy, Kiltinanlea, Temple Mochulla, Kilconry, Bunratty, Feenagh, Kilchrist, Killadysert, Kilfiddan, Killoffin, Kilcrony, Templeanaird, Kilballyone, Killard, Kilmurry-Ibricane, Moy and Kilfarboy, in Killaloe.

The complete similarity of the architecture of this group of

¹ "Cal. State Papers, Ireland," 1302-6, p. 298, &c.

² "Cal. State Papers, Ireland," 1302, p. 290.

³ "Monumenta," p. 433.

churches to that of the Peel Towers is very instructive and noteworthy.¹ There are also some curious survivals, such as semicircular splay, angular heads, interlacings and triquetras, and lintelled doors, which recall the earlier buildings of the tenth century. Turlough MacMahon, chief of Corcovaskin, aided by his wife More, daughter of O'Brien, restored twelve parish churches and built a monument for himself in St. Mary's Church in Clonderlaw (probably Kilmurry MacMahon), while his wife put up the beautiful canonied tomb in Ennis Friary. He died in 1472.²

At last, in 1584, we get a list of the parishes much as they exist on the present maps of Clare. Five new parish churches seem to have been added—Kiltanayn (Kiltinanlea), Kilaspule (if not Killaspuglonane, a Kilourg Lonane appearing on same list), Owghtory (Oughtdarra), Kilvedane (Kilvoydane, near Corofin), and Ross, now figure as parish churches—but the list is neither authoritative nor accurate. This is not the case with the reports made in the following reigns: the Visitations of 1615, 1621, and 1633. The first is literally "written within and without with woe," few, indeed, of the churches being in any sort of repair. These may be noted as bearing on our present Survey. "*Church and chancel in repair*": (1), Feakle (shingled well); Kiltinanlea, Tulloghe, Inchicronan ("in repairing"), Clonloghan, Kilmaley, Rath, Kilnamona (reasonable repair); Clondagad, Killedisert (in repairing); Killofin, Kilmurry, Clonderlaw (reasonable repair); Killard, "Killamure" (Killimer), Killmichill, Kilmurry-Ibricane, Kilfarboy. "*Chancel*" only in repair: Tomfinloh, Disert. "*Chancel*" only ruinous: Killuran; twenty in all. *Roofless, but otherwise entire*: Kilnoe, Killokennedy (roof unthatched); Kilmorinagall, Kilmacduan, Kilballihone, Moefartah. *Unrepaired*: Kilkeady and Killfieraghe. *Stated to be ruins*: Clonlea (old walls only); Moynoe, Iniscaltra, Quyn, Clonee, Dury, Killraghtas, Killtoolaghe, Killinafinlaghe (Kilfintinan), Kilmallery, Kilconry, Inisdadrum (no church, no inhabitants), Killeneboy, Killechrist and Kilfeddan. Those not otherwise specified were probably in no better condition.

In Kilfenora the Cathedral was being "covered" out of the tithes of Killeny and Kiltoraghe. In short, in the whole of that diocese there was not a single church in repair, and that after twelve years of peace. Noehwall and Killonoghan are stated to be "all down," but

¹ Compare illustrations in *Proc. R.I.A.*, Ser. III., vol. v., p. 348.

² Brudinus, "*Propugnaculum Catholicæ veritatis*," citing manuscripts extant in Clonderlaw Castle in 1640. The old Latin Pedigree in Ulster office supports these statements.

as the walls of these venerable buildings stand to our day the note does not explain how their desolation exceeded that of the other ruins. The Cromwellians considered that the three churches of Ennis, Six-milebridge and Killaloe, were sufficient for the spiritual wants of the English settlers in 1652. There were, indeed, only 440 English among 16,474 Irish seven years later.¹

Finally, in 1693, we find only these churches named as being in repair—Ennis, Kilrush, Kilfinaghta (not the ancient one at Ballysheen, but the later one now in use in Sixmilebridge), and Kilmurphy in Clonderlaw.¶ The Cathedral of Killaloe was then out of repair, and Clondragad not in full repair. Kilnasoolagh and the cathedrals, if not many others, were, however, in unbroken use, and probably in some sort of repair. In 1900 the two cathedrals and Tomgraney church are the only ancient buildings used for worship, but the Protestant churches stand beside or on the sites of the old parish churches at Feakle, Quin, Kilnasoolagh, Kilrush, and Kilmurphy MacMahon.

RURAL DEANERIES AND TRIBAL DIVISIONS.

The rural deaneries in the diocese of Killaloe are important as representing and showing the principal tribal divisions of the thirteenth century. These were, so far as we can combine the visitations of the seventeenth century:—

I. The deanery of KILFENORA, covering the ancient Corcomroes.

II. OGORMUCK, Ui gCormaic, or Dromcliff,² covering the ancient Ui gCormaic, the land of the O'Hehirs, the "Cantredum Insularum," now Kilmaley, Dromcliff, and Killone, with Kinel Fermaic, "the upper cantred of the Dalcassians"—Kilmaley, Dromcliff, Rath, Dysert, Kilkeedy, Kilnaboy and Kilnamona.

III. OGASHIN, Ui gCaisin, the Macnamara's land—Quin, Tulla, Clooney, Kilraughtis, Kiltoolagh, Templemaley, Inchicronan, Kilmurphyne-gall and Doora.

¹ Reid's "Hist. Presbyt.," vol. ii. p. 496; Dwyer's "Diocese of Killaloe," pp. 298 and 315.

² Hy Cormaic was occupied before 845 by certain Eoghanacht tribes, "Woe is me, they have gone into exile. . . . Ui Cormaic and Tradraidhe are much in want of relief; they are from their friends far away," Book of Lecan. (See O'Curry's "Manners and Customs," III., p. 262.) This misery may have been caused by the ravages of the Danes in Tradree in 834. The O'Hehirs are very probably a remnant of these tribes. Another tribe in Tradree in 1151, An. F. M., was Clan Delbaeth (O'Neill Buidhe). (See O'Curry "M. & C.," II., p. 220.)

IV. OMULLED, Ui mBlold, the land of the O'Kennedys, &c., annexed by the Macnamaras after 1318—Clonlea, Kilfinaghta, Kildeely (Kilseily), and Killokennedy, and Ogonilloe. *Ui Ronghaile*, the land of O'Shanaghan,¹ Kilnoe, and Feakle, Killuran. *Kinel Donghaile*, the land of O'Grady, Moynoe, Clonrush, Iniscaltra, and Tomgraney. *Ui Thoirdealbhaigh*, Killaloe and Dunasgy (Kiltinanlea).

V. TRADREE, Tradraighe,² the mensal land of the early Dalcassian kings and site of De Clare's Colony. This was assigned to Limerick in 1110, and given to Killaloe before 1302—Tomfinlough, "Killinafin-taghe" (Kilfintinan), Kilmaleery, Kilconry, Clonloghan, Dromline, Kilnasoola,³ "Killonie or Killughe" (Killoe, Killuga, in 1302), Inishdadrum.

VI. CORCOVASKIN, the land of the race of Cairbre Bhaisscinn, Clondregad, Kilchrist, Desert Murhuly (Killadysert), Kilfeddan, Killoffin, Kilmurphy, Clonderlaw, "Killamure" (Killimer), Kilmihil, Kilmacduane, Kilrush, Moyfertagh, Kilferagh and Kilballyone, Ibrickan, Kilmurphy-Ibrickan, and Kilfarboy.⁴

As to most of the lay divisions, the earliest information we have, which marks their limits with any degree of distinctness, is derived from the rentals of O'Brien and Macnamara,⁵ evidently contemporaneous, and the latter is stated to have been compiled (about 1390) for Maccon Macnamara, chief of Clancuilen, grandson of that Lochlan who was executed at Lough Colmin in 1313, by Sir Richard De Clare's allies of the Hy mbloid.

TUATHGLAE covered the parishes of Clooney, Kilfenora, and Killaspuglonane in Corcomroe.

GLAE, corresponded to Killilagh parish.

CARRAICALEBOIRNE contained the parishes of Kilmoon, Killeany,⁶ Killonaghan, Gleninagh, Dromcreehy, Rathborne, Nuoghaval and Carran, with a portion of the northern edge of Kilfenora parish, thus comprising the greater part of Burren.

A nameless division on the Shannon, included Kilmurphy-MacMahon, Killoffin, and Kilfeddan in Clonderlaw.

¹ Macnamara's Rental, c. 1380, Trans. R. I. A., vol. xv.

² Tradree was inhabited by the Ui Sedna before the Dalcassians invaded Clare.

³ Ui Dobharcain, the patrimony of O'Liddy, lay between Doora and Kilnasoola in 1312 ("Wars of Torlough").

⁴ The 1633 Visitation includes Killone, "Rcōria iḡppriata monasterio de Killone possessa p. Baronem de Inchiquin."

⁵ Trans. R.I.A. vol. xx., p. 36, 43.

⁶ These formed Tuathmacaire.

In Eastern Clare, **TUATHMOR**, the great possession of the Macnamaras, included the parishes of Inchicronan, Doora, Kilraghtis, Clooney, and Tulla, practically upper Bunratty with Tulla parish, corresponding to the rural deanery of Ogashin.

TUATH O BFLIOIN lay in Kilseily and Clonlea.

TUATH EACHTAOI was Feakle.

UI RONGHAILE lay in Kilnoe and Killuran, with a portion (Ross) of the southern edge of Feakle.

TUATH NA HAMHAN was comprised in Kilfinaghta parish.¹

UI CONGALACH exactly corresponded to its modern namesake Ogonnelloe parish.

CIL O GCINNEDI also covered the modern Killokennedy, with a portion of the later parishes of Kiltinanlea and O'Brien's Bridge, where they adjoined its eastern border. These with the addition of the O'Grady's land of Cinel Donghaile (which for obvious reasons does not appear in the rental)—Tomgraney, Moynoe, Iniscaltra, and Clonrush—still form the rural deanery of Omulled.

UI gCORMAIC was once only Drumcliff, Kilmaley, and Killone, but in church topography, Ogormuck included both **Ui gCormaic**, and **Ui Fermaic**.

From other sources it is evident that the remaining divisions were—

UI FERMAIC, the parishes of Kilkeedy, Kilnaboy, Rath, Dysert, and Ruan.

CINEL CUALLACHTACH, Kilnamona, and a portion of Inagh.

BREINTIR FERMACACH, the larger part of Inagh Parish.

UI AINMIRE lay in Kilfintinan, Killely, and the parishes given to the churches of Limerick.

TUATH NA FEARNA was in Killadysert.

TUATH NA MBUILC, round Dangan Castle, in Kilchrist Parish.

TRADRAIGHE, the O'Brien's mensal land, is well defined by the inquisition taken in 1287 on the death of Sir Thomas de Clare. It comprised ten parishes and churches, and its lands are mentioned in those of Quin, Kilmaleery, Tomfinlough, Kilfinaghta, Kilmurrynegall, Kilconry, Clonloghan, Kilnasoola, Feenagh, and Bunratty. Quin has been since assigned to Ogashin, otherwise, in De Clare's Tradree, the rural deanery of 1617 stands confessed.

¹ Frost's "History," p. 61, identifies this parish with **Ui Cearnaigh**.

We have no old authority for the extent of CORCOVASKIN and IBRICKAN, but their exclusion from the other early districts shows that they are included in the rural deanery of Corcovaskin, and some isolated hints imply that eastern Corcovaskin comprised Clonderlaw and the parish of Clondagad.

MODERN CHANGES AND BUILDINGS.

Ennis Friary was adapted as a parish church for the parishioners of Doora and Dromcliff in 1615 at the expense of the Earl of Thomond. We have no record of such adaptation in the cases of Corcomroe and Clare, though in the eighteenth century a portion of Oughtmama parish seems to have been annexed to the former as "Abbey" Parish, while the old parish of Killoe, and a section on the western bank of the Fergus, representing it may be the Kellargenayn of 1302, were united to form "Clare Abbey" parish.

Clonrush and Iniscaltra were assigned to Galway before 1610.¹ I have found no definite record of the transfer. It evidently took place gradually, as there is an Elizabethan map in the Hardiman collection,² in which Iniscaltra is shown in Thomond, and Clonrush in Galway. They are understood to have been restored to Clare in 1898, under the Local Government Act. Inagh seems to have been merged into Drumcliff in 1610.

Hely Dutton, in the "Statistical Survey,"³ gives a series of parish churches, among which appear several which cannot be identified. In *Burrin*, Glunning, Glenvaan, Crunane; *Inchiquin*, Kiltullogh, Kilmacduagh; *Bunratty*, Doroney, Coonock, Killeby; *Tullagh*, Frenagheragh, Cruight; *Ibrickan*, Innisclea; *Moyferta*, Killenedane, Kilnagleagh and Mollough.

As for the modern Protestant churches, Lewis gives the following dates, which, in some cases at least, mark the desertion or destruction of an older building:—

Clare Castle, 1813; Clondagad, 1808; Clonlara, 1815 (Belfry, 1831); Clonlea (Kilkishen), 1811; Ennis (struck by lightning and repaired), 1817; Ennistymon, 1830; Feakle, about 1823; "Kilfarboy," i.e., Miltown Malbay, 1802; Kilnasoola, 1815 (older church removed); Kilmurry-MacMahon (old church removed), 1810; Kilnaboy, i.e., Corofin, 1829; Kilquane, 1819; Kilrush, 1813; "Kilseily," i.e., Broadford, 1811; Quin, 1797; "Rathbournay," about 1797;

¹ Speede's map.

² Table MSS. room, T.C.D.

³ P. 103.

Sixmilebridge (rebuilt), just before 1837; Tulla, 1812; "Killard," *i.e.* Dunbeg, 1807. I may also add Ennis new church, consecrated 30th Nov., 1871. In only one case (Kilmurphy), however, was a mediæval church destroyed.

The modern Roman Catholic churches are not recorded in any accessible authority, so I have not been hitherto able to procure the dates of any except the cathedral of St. Peter and Paul in Ennis, 1843 (consecrated Feb. 26th, 1843, by Right Rev. Dr. Kennedy), the old chapel was in Chapel-lane, a wing was added, 1773; Corofin, 1822; Clonlara, 1815, (rebuilt) 1875; Mountshannon, 1836; Tomgraney, 1893; and Kilshanny, 1896.

The Presbyterian Church of Ennis was built, 1855 and 1856; and Dysert Moravian Church, 1793. In none of these cases was an ancient site affected.

TYPES OF THE CHURCHES.

Omitting the cathedrals and post-Norman monastic churches, we may class the ancient places of worship as follows:—

1. *Dry Stone Oratories*.—So far as I know only one exists, on Bishop's Island near Kilkee. (See illustration, p. 166, *infra*.)

2. *Small Oblong Oratories* (in which mortar is used, and in which the west door has a lintel and inclined jambs).—Termon Cronan; Tomfinlough; Kilrush, near Limerick; Clonloghan. (Illustrations, Plate XI.)

3. *Large Oblong Churches* (of similar type).—Templemore, Kells (Plate IX.); Tomgraney (Plate XIII.); Scatterry, "Cathedral," and Temple Knockanangel (Illustration, p. 170, *infra*), and remains embodied in Kilmoon, Rathborne, Kilshanny, and Kilmacreehy.

4. *Stone Roofed Oratories* (with overcroft).—St. Molua's on Friar's Island (Illustration, p. 159, *infra*.); St. Flannan's, Killaloe.

5. *Churches with Nave and Chancel* (early and plain. In most cases the chancel is evidently an afterthought).—Oughtmama great church; Noughaval (Illustration, Plate VIII.); Kilcorney; St. Caimin's, Iniscaltra; Kilrush in Moyarta and Rathblamaic. In some cases the structure has been largely rebuilt, as at Dysert O'Dea.

6. *The Oblong Plain Church* (with arched door, &c.).—Oughtmama 2 and 3, Kilcredaun, Tomfinlough parish church, Dromcliff, Doorra, Inchicronan, Killilagh, Kilmacduan and Kilnaboy. (Plates IX., X.)

7. *The Decorated Romanesque Churches*.—These occurred at Killaloe Cathedral (door and fragments exist), and the Church of Baptism,

Iniscaltra, Kilfenora Cathedral (window), while ornamental windows and doors have been inserted in the earlier churches at Dysert O'Dea; Rathblamaic; Temple Shenan and Oratory, Scattery; Kilcredaun; St. Caimin's, Iniscaltra; Kilcorney; Inchicronan; Tomgraney; St. Flannan's Oratory, Killaloe; well-moulded windows occur also at Killeany, Kilkeedy, Doorra, Ballysheen, Killimer, Noughaval; and others chamfered and recessed at Dromcliff, Templemaley, Kilmacduane, Killimer, &c. (Illustrations, Plates VIII. and X.)

AFTER THE YEAR 1200.

8. *Early Gothic Details.*—Plain lancet windows, St. Finghin's, Quin; Moynoe; present chancel of Dysert O'Dea; east gable of Tomfinlough parish church (since altered) and south window. (Illustrations, Plates X., XII.)

9. *The Oblong Church* (fifteenth century), with pointed south or west door, slit windows with pointed, round, trefoil, or ogee heads. The greater number of churches in the district are of this type. The windows rarely have more than two lights; a few of the later examples have cross-bars (Rathborne; Kilnaboy, Killadysert and Kilfenora chancel (south wall)); a few had simple interlaced tracery as Kilshanny and Kilchrist. Scattery Cathedral had two lancets and a quatrefoil above. It is interesting to note (as shown in the Plates illustrating this Paper) how closely the semicircular heads of several splays of the fifteenth-century windows resemble those of early pre-Norman times. In many cases a bell chamber stood on the west gable. Chancels occur only at Kilkerin, Kilmacreehy, Killeany, and Dromcreehy. (Illustrations, Plate XII.)

10. *Belfry Towers* occur only at Killadysert and St. Finghin's, Quin. (Plate X., 202). The tower near the west end of Moynoe was probably a castle.

There are, however, some good examples in the Cathedrals and Monasteries. Killaloe Cathedral seems to be the only case of a tower forming part of the plan of even the existing building. At Canon's Island the tower is attached to the church, and partly built on an older wall. In Clare, Ennis, and Quin, it is inserted in the long body of the church, and at Kilfenora and Corcomroe it caps a clumsy gable through which a staircase ascends.

11. *Transepts* do not occur in the churches; and accessory chapels and sacristies are almost absent; the few that exist (Kilnamarve, Scattery Cathedral, Kilmoon, Killilagh, Kilkeedy, Ruan) are small

and of little architectural interest. Priests' houses are found at a few places—Toomullin, Correen, Killballyone, Temple dubh, Leanna, and Clonrush.

OTHER FEATURES.

Round Towers remain at Kilnaboy, Dysert O'Dea, Dromeliff, Iniscaltra and Scatterry; there is reason to believe that others once existed at Tomgraney and Rathblamaic.¹ (Illustration, Plate X.)

High Crosses and Standing Crosses.—There were four sculptured crosses at Kilfenora. One has been removed to Clarisford, near Killybeg. A plain cross and the site of another are also shown. A beautiful high cross remains at Dysert O'Dea, and remains of plainer ones at Skeagh-a-vanoo, near Kells, and Kilvoydane, near Corofin; a curious tau cross stands at Roughan, near Kilnaboy,² and rude crosses at Termon Cronan, Dysert, and Noughaval. There were at least two crosses of some size at Iniscaltra; on the base of one appears the inscription *✠ llab i Dechenboip*. Several cross sites are remembered near Corofin, Monasternashraduff, near Dysert, and Glennagross. Ardnacrusha, near Limerick, Crusheen, and "Cross" at Kilkeedy.

Carvings of Scriptural Scenes.—Single figures of our Lord crucified occur on the crosses at Kilfenora and Dysert O'Dea, circa 1150. A more elaborate panel of the Crucifixion, and scenes from the Passion—the arrest, the scourging, the entombment, and the Resurrection, are found on the base of the 1460 "Mac Mahon" tomb in Ennis. A figure of our Lord mocked lies in a recess in the chancel; it formed a boss in the canopy of the same tomb. Carvings of our Lord and the Apostles occupy the recess of that monument. The Virgin and Child

¹ See *Journal R.S.A.I.*, 1894, pp. 28, 333, &c.; 1897, p. 282. *Proc. R.I.A.*, Ser. III., vol. v. (1899), pp. 297, 298.

² It is necessary to note, in face of recent attempts to deny the identity of the "present" cross with that so strangely and incorrectly described by Hely Dutton and others—1, that the present cross is recognised by many persons now living in the neighbourhood as the one removed from the site some thirty years ago; 2, that a local antiquary has a letter from a neighbouring gentleman, in which the latter states that he heard the former owner of the house in which the "present" cross was found say that he had taken it away; 3, the "present" cross corresponds to the description of the "former" cross in the Ordnance Survey Letters, R.I.A., in 1839; 4, that I have heard, so far back as 1878, the name of the person who removed the cross, and that he lived at the place where the "present" cross was found. Dysert, Roughan, Skeagh a vanoo, and Kilvoydan, are carefully described, by Dr. G. Macnamara, in the *Journal R.S.A.I.*, 1899, p. 244; 1890, p. 26.

are found on the screen under the belfry, and the "Ecce Homo" is carved on the northern arch of the transept of the same monastery. The figure of our Lord lying dead on the lap of another figure (now broken), remains in the church of Kilmurry-Ibricane. The crucifixion occurs in stucco at Quin. A curious carving on the base of the cross of Dysert probably represents Adam and Eve.¹

Carvings of Saints.—Figures of St. Fachnan(?) and St. Tola appear on crosses respectively at Kilfenora and Dysert. Certain bishops' heads are said to represent St. Senan, St. Maccreiche, and St. "Moon," at Scattery Cathedral, Kilmacreehy, and Kilmoon. The wooden figure of "St. Carrol" has, I believe, vanished from Kilcarrol. "St. Luchtighern and his deacons" appear over the door of the oratory of Tomfinlough (see Pl. XI., fig. 10); St. Francis in the nave of Ennis Friary; and it is possible that other mysterious panels at Dysert may show St. Tola presiding over the erection of a termon cross, and St. Blathmac struggling with the local monster, or brocach.

Sheela-na-Gigs are found at Rathblamaic on a richly carved window-sill²; at Kilnaboy above the south door: both of these are perfect; one from an unknown site and greatly defaced was inserted into the wall of the Clonlara canal bridge in 1769.

Bullauns, though not uncommonly found near forts and cromlechs, seldom occur near Clare churches. Specimens in the native rock are to be seen near Kinallia, and Kiltinanlea churches; one, in a block of granite, lies in the nave of Clare Abbey, while several occur in boulders and loose blocks near Leanna church site, and single basins at Kilvoydane, near Spansil Hill, and Fomerla, near Tulla.

Founts of mediæval times are few in number. A decorated one is found at Killaloe, and one remained in 1816 at Kilballyone; a fine fluted font of the later twelfth century is at Kilfenora Cathedral, one, probably of the fifteenth century, at Killone convent, one with spiral flutings in Kilkeedy, a curious square one at Kilcorney, a round one at Dysert O'Dea, and a plain but neat octagonal one in Clare Abbey.

Altars (mediæval) are not numerous. We find a neat early example in St. Caiman's, five in Quin Friary, one in Ennis Friary, one in Corcomroe Abbey, some traces at Canon's Island Abbey, the arcaded front slab of one at Kilnaboy; rudely built altars are found at Killeany, Kilshanny, Carran, and Kilmoon. Others outside the church remain at Kinallia, Killeany, and Noughaval.

¹ *Journal R.S.A.I.*, 1899, p. 248.

² *Journal R.S.A.I.*, 1894, p. 31.

Tombstones with early Celtic crosses or Irish inscriptions.—Three at Oughtmama, one at Scattery, one at Killaloe Cathedral, at least three dozen at Iniscaltra (17 with inscriptions), and a doubtful (or rather, perhaps, late) example at Kilshanny.

Monumental Effigies.—King Conor O'Brien, 1268, and a Bishop at Corcomroe; early Bishop and later Bishop, Kilfenora.

Incised post-Norman Crosses.—Three at Kilfenora, two at Corcomroe, one at Clare Abbey, one at Iniscaltra.

Canopied Tombs.—Kilmacreehy, Kilfenora, Corcomroe, Kilshanny, Kilnaboy, Ennis, Quin, Ballysheen; those at Kilmacreehy, Kilfenora, Corcomroe, Ennis, and Quin, being ornamented, the others very plain.

Rounded Stones, often called "cursing stones," lie upon the altars of some churches. Those at Kilmoon have been used for cursing.¹ There seems no definite tradition of this practice at Ross (Temple na Naev), Kinallia, Killeany, or Killone (St. John's Well), though in each case such stones lie upon the altar. Kinallia also possesses a flat rounded stone with two oblong flutings with rounded ends, the use of which is not clear.

Relics.—We hear of the Danes having "drowned the relics and shrines of Iniscaltra, Lough Derg."² The Life of St. Flannan describes the "bachall" of the saint as decorated with golden ornaments. The life of St. Maccreehy mentions a bell which that saint brought from Rome and which was long preserved in his church. The relics of Colomb, son of Crimthann, were taken by Mo Coemhe of Terryglass, and by Odran in a wain over Esge (? Ectge) southwards to Iniscaltra to Camine of Iniscaltra.³ Tradition mentions the bells of Dromcliff thrown into the Poul na Clug, near the church, and the bells of Kilnaboy concealed in a swampy patch near the road to the south of the ruin. A very vague tradition mentions a bell, "the black bell," preserved among the Macnamaras. A "brass" bell was found inside the round tower of Dysert O'Dea, and was exchanged for a new bell in Limerick about 1838.⁴ Two handsome silver brooches and a silver candlestick were found in the ruins of Scattery, and were brought to Cork.⁵ The "Black Book of St. Mochulla" at Tulla was last heard of in the Delahyde lawsuit of 1627.⁶ All these relics seem to have disappeared. The

¹ R.S.A.I. Journal, 1900.

² "Wars of the G. & G."

³ Dec. 13, "Oengus," p. 182.

⁴ R.S.A.I. Journal, 1894, p. 156.

⁵ "Lady Chatterton's Rambles in the South of Ireland," vol. ii., pp. 228-229. Figures in R.S.A.I. Journal, 1897, p. 281.

⁶ MSS. R.I.A. 24, D. 17, p. 45.

following are fortunately extant:—The Clog-an-Oir of Scatterry, a beautiful little bell shrine of two periods, is in the hands of its hereditary keeper, Mr. Marcus Keane, of Beechpark, a representative in the female line of the Cahanes, coarbs of St. Senan.¹ Anyone swearing falsely on it was liable to be seized with convulsions ending in death. The bachall of St. Blawfugh or Blathmac of Rath was long kept in the wall of the old chapel of Corofin; the people used to swear upon it. The bachall of St. Manawla of Dysert, which was preserved down to the present reign in the family of its hereditary keepers, the last of whom, an old woman named, I believe, O'Quin, sold it. Both these fine croziers are in the museum of the Royal Irish Academy, and have been figured and described in the *Journal* of the Royal Society of Antiquaries.² The bell of Rath, a small oval hand-bell of very thin bronze, and the crozier of St. Colman MacDuagh are also preserved in the same museum. The shrine of St. Lachteen's arm, though it was not made in Clare, was preserved at his church in Kilmamona before Bruodin's time, and thence removed to Lislachtin. The Clog naove Augustin of Kilshanny, a bell (possibly of St. Cuanna) now in British Museum.—It was used to swear upon, and was reputed to twist the mouths of perjurers to one side. The only other church relics are a few seals, and some pages believed to be part of St. Caimin's Commentary on the Psalms, and now preserved in the Franciscan's Library, Dublin.³ The beautiful shrine and book of the "Stowe Missal," in the Royal Irish Academy, belong, it is true, to Thomond, and mentions its king, Donchad, son of Brian Boru, but it was not made, nor so far as we know preserved, in county Clare. It probably belonged to Lorrha, and bells of the same church and of Scatterry are preserved in the British Museum.

Mediæval Plate.—The church plate (both gold and silver) of the Friaries of Ennis and Quin fell into the hands of laymen in the reign of Elizabeth. Father Mooney tells how the Earl of Thomond held the plate of Ennis, and how the wife of Macnamara, of Knappogue, after the death of her husband, retained the plate of Quin, which had been confided to him for safe keeping.⁴ In 1573 the church plate of Kilnaboy was carried off by Teige O'Brien and his followers, and this

¹ Bell of Senan, see *Archæol. Journal*, V., p. 331. *Proc. R.I.A.* (Jan. 25), 1864, p. 476. *Archæologia*, xxi., p. 659, exhibited March 9th, 1826, and *R.S.A.I.* 1900.

² *R.S.A.I.*, 1894, pp. 338-339.

³ See a Paper, by Mr. Hennessy, in the *Dublin Ecclesiastical Record*, 1873.

⁴ Mooney MSS., Bibliothèque Royale, Brussels, No. 3195.

sacrilege was soon afterwards avenged by their disastrous defeat at Beal an chip.¹

Church Plates.—The Protestant churches.—Killaloe Cathedral, paten, “Ex dono reverendissim in Christo Patris, Nicholai Episcopi Leonensis.” Flagon—“Deo et sacris per Rever. Dan. Witter, sac. sanct. Theol. Doct. et Episc. Laonen., 1674.” Ennis has a chalice with the words, “For Ennis Church, 1683.” Kilnasoola has a chalice and paten with this inscription, “Ex dono Donati O’Brien Baronetti in usum ecclesiæ Killanasulach in Comitatu Clare,” c. 1690. Kilfinaghta, a chalice with “The gift of (apparently T. W.) to ye Six Miles Church in ye County of Clare, July ye 8, 1713.”

In the Roman Catholic Church of Corofin are three noteworthy chalices with the following inscriptions:—1. “Calix benedictionis cui benedicimus nonne communicatio sanguinis Christi 1 Cor. x. D. Robertus Arthurus et Margarita Blake ejus soror Deo Optimo maximo dicant.” No. 2. “Ex dono Thadæi Daly Renaldus O’Kelly sacerdos, 1620.” No. 3. “Orate pro anima Jacobi O’Grypha sacerdotis qui me fieri fecit, 1670.” The latter were repaired by the Rev. James M’Mahon in the present century.

Church Glass.—Of course no great trace remains of mediæval glass. Fragments of coloured glass were found at Inchicronan, and we read of “blue coloured glass” at Ennis Friary. Many of the small windows, even in the fifteenth-century churches, were evidently never glazed. A heavy cast-iron window-frame, turning on pivots, and made to hold 16 small panes, was found in the ruins of Ennis Friary, and was long preserved at Stamer Park.

Among the many friends who helped me in this survey I can only name the principal, Mrs. O’Callaghan, of Maryfort, Mrs. Stacpoole, of Edenvale, Mrs. MacDonnell (junior), of Newhall, the late Dr. W. H. Stacpoole Westropp, of Lisdoonvarna, the late Mr. George Studdert O’Sullivan, Dr. George U. Macnamara, Rev. J. B. Greer, Mr. Richard J. Stacpoole, and Colonel George O’Callaghan Westropp. While outside the district I most gratefully acknowledge many valuable suggestions from Mr. Robert Cochrane, Sir Thomas Drew, Mr. James Mills, Mr. Standish Hayes O’Grady, and the late Dr. W. Frazer.

¹ “Annals of the Four Masters.”

SURVEY OF THE CHURCHES.¹

A **UNIFORM** order has been adopted in this list: (1) the name; (2) sheet of the Ordnance Survey, of 6 inches to the mile; (3) the parish, if the church is not a parish church; (4) dimensions and architecture: appended buildings, if any; (5) name and date of the reputed founder, with historical notes actually bearing on the building, age, and ancient form of the name; (6) principal monuments before 1800; and (7) published descriptions.²

¹ Works quoted in succeeding list:—

- Survey "Letters," R.I.A. MSS. 14 B 23 & 24. (Written 1839.)
 R.I.A., Royal Irish Academy, "Proceedings."
 R.S.A.I., Journal Royal Society of Antiquaries of Ireland (The Kilkenny Society under its successive names).
 P.M.D., Association for the Preservation of Memorials of the Dead in Ireland.
 Braash, Richard Rolt, "Ecclesiastical Architecture of Ireland."
 Dutton, Hely, "Statistical Survey of the County of Clare."
 Dunraven, Earl of, "Notes on Irish Architecture."
 Dwyer, Rev. Canon Philip, "History of the Diocese of Kilaloe."
 Frost, John, M.B.I.A., "History and Topography of Co. Clare."
 Grose, Captain Francis, "Antiquities of Ireland."
 Keane, Marcus, "Towers and Temples of Ireland."
 Mant, Bishop, Paper on "Killaloe," read before the Down, Connor, and Dromore Architectural Society, 1844.
 Mason, Wm. Shaw, "Parochial Survey of Ireland, 1819."
 O'Hanlon, Very Rev. John, "Lives of the Irish Saints."
 Petrie, Dr. George, "Ecclesiastical Architecture," 1845 Edition.
 Stokes, Miss M., "Early Christian Architecture in Ireland."
 "Transactions," Royal Irish Academy, vol. xv.—Rentals and Deeds.
 "Proceedings," Royal Irish Academy—Quin Abbey, T. N. Deane (1882).
 "Journal," Royal Society of Antiquaries of Ireland—Churches near Lisdoonvarna, Dr. Martin (1870). Iniscaltra, M. Lenihan (1889).
 Bunratty, Quin, &c., T. J. Westropp (1890). Killaloe, same (1892, 1893). Churches with Round Towers in Northern Clare, same (1894).
 Aran, the Burren, and Corcomroe, same (1895). Scatterry and Canon's Island, same (1897). Clare, Killone, and Inchicronan, same (1900).
 Churches in the Burren and Corcomroe ("Proceedings"), same (1900).
 The Ascetic's Church, Dr. George Macnamara (1897). The Stone Crosses of Ui Fermaic, same (1899–1900).

² I omit the short notices in Topographies and Histories in which detailed descriptions do not occur.

DIOCESE OF KILFENORA.

BARONY OF BURREN.

1. GLENINAGH, Sheet 2.—*Parish church*, 38 feet by 13 feet 4 inches.
A plain rude building, with a pointed south door, and lintelled south window. Round-headed east window. “Glaniednagh,” 1302.
2. DROMCREEHY, Sheet 2.—*Parish church*, 52 feet by 21 feet 6 inches.
An early church, with large masonry, and finely built windows, probably of the eleventh century. The eastern is thickly ivied, the south has a well-made splay, and a semicircular moulded head. The north door is round-headed, and similar to the west doors of Quin and Abbeydorney, it is of the earlier fifteenth century. The west end has fallen, also the chancel arch. *Founder* doubtful. “Dromcruth,” 1302. The well is named Tobercore, and Colman is traditionally the patron. *Description*, R.S.A.I., 1900, p. 301.
3. OUGHTMAMA, Sheet 3.—*Parish church*. Nave and chancel, 45 by 21 feet, and 21 by 18 feet. The west door has inclined jambs and a massive lintel; the two south windows and the chancel arch have semicircular heads. In the south-west corner is set a font carved with two struggling animals. The semicircular head of the fallen east window is used by the peasantry to cure headaches. *Founder* uncertain; “the three Colmans” of this place are named without date.¹ The church dates before A.D. 1000. *Descriptions*, R. R. Brash, p. 16; M. Keane, p. 375; Lord Dunraven, I., p. 102; J. Frost, p. 25; T. J. Westropp, R.S.A.I. 1895. *Monuments*, several slabs, with defaced Irish inscriptions, lie in the chancel. The ruins are vested as National Monuments.
4. *Same*. A second *oratory* lies 27 feet east from the last, 24 by 15 feet. The west door and east window have semicircular heads. It probably dates from the eleventh century.
5. *Same*. A third *oratory* lies to the north-west of the other churches. Only the east gable remains, with a slit window, with plain splay and semicircular head.

¹ Calendar of Oengus.

6. CORCOMROE ABBEY, S. MARIA DE PETRA FERTILI OR DE VIRIDI SAXO.—*Abbey Parish*, Sheet 3. It consists of a cruciform church, with a richly-vaulted chancel roof and clustered columns. A small chapel lies to either side of the chancel. To the south of the church is a small cloister garth with buildings to the east. Two detached buildings lie to the south, and a gate-house to the west. The remains of a massive wall enclose an extensive park round the abbey. There is a well named Tobersheela. Most of the fabric of the abbey is of the late twelfth and early thirteenth century. *Founder*, Donaldmore O'Brien, King of Munster, c. A.D. 1180–1190. *Monuments*, Conor na Siudaine O'Brien, King of Thomond, slain in battle, 1268. A very perfect effigy. The figure of a bishop in full pontificals. A cross carved on a slab of yew. *Descriptions*, Dublin Penny Journal (illustration), 1833–1834; Guide to Lisdoonvarna, 1876; Report of the Board of Public Works, 1878, 1879, p. 72 (plan and good illustrations); Frost, p. 22; P.M.D. II., p. 275; T. J. Westropp, R.S.A.I., 1895 and 1900, p. 301 (all with illustrations). It is vested as a National Monument.
7. KILLONASHAN, Sheet 4.—*Parish church*, 48 by 21 feet. The ruin has a well-built east window, with a semicircular head and external moulding; the other features are defaced. Probably c. 1080. *Founder*, Onchu, probably son of St. Blathmac; if so, c. A.D. 580. "Killonchan," 1302.
8. CRUMLIN, Sheet 4.—*Killonaghan Parish*. Only the east gable and parts of the sides remain; the east and south windows have each got rudely arched semicircular heads in the splay, and semicircular heads cut in single blocks of stone in the light. *Founder*, according to tradition, St. Columba, who built it after leaving Aran; perhaps the present building is of the tenth century. "Cromglaon" (crom gleann), 1302, i.e., "crooked glen." It was at that time a parish church.
9. RATHBORNEY, Sheet 5.—*Parish church*, 56 feet 6 inches by 21 feet. A late Gothic building, c. A.D. 1500, except the lower part of the east and north walls for about 5 feet high, which seem early Irish work. The east window richly moulded, divided by a shaft and transom into four lights, with trefoil heads and a flat hood.¹ South window has a single trefoil-headed light.

¹ See illustration, Plate XII., fig. 7.

Pointed south door richly moulded, with a broken double-oped stoup in the right jamb. *Founder* unknown. "Rayth," in 1302. Some trace remains of the rath from which it is named, "the Rath of Burren," it is included in the graveyard. There are some modern crosses of a very archaic type, with square head and arms, and expanding base.¹

10. KILBRACK, Sheet 9.—*Rathbornev Parish*, near Cahermacnaughten. The walls and gables remain thickly ivied. The name is preserved in the Book of Distribution, 1655.
11. KILMOON, Sheet 21.—*Parish church*, 52 by 18 feet. Its featureless north wall, and the south-east angle, of large and very early masonry, with a plinth, remains. A carved corbel, with a bishop's head, and the pier and corbel of an arched canopy over the altar, are alone of interest. A late fifteenth-century mortuary chapel, 24 feet by 20 feet, lies 5 feet from the south wall of the church, There is also a holy well (Tobermoon), with a tree and "cursing stones." A plain pillar, called "the cross," stands some distance to the east. *Founder*, perhaps Mogua (but the present form of the name is difficult). "Kilmugoun," in 1302. *Descriptions*, O'Hanlon, vol. ii. (illustration), p. 180.
12. KILLEANY, Sheet 5.—*Parish church*. Nave, 34 feet 6 inches; chancel, 19 feet 2 inches long; and both 19 feet 2 inches wide. The east gable dates *c.* 1080, with a neatly moulded and splayed semicircular-headed window; the outer head has a draconic ornament. There is a projecting moulding under the window, like that at Manister Kieran, in Aranmore. The altar is extant. The other features of the church date from the fifteenth century, being a large pointed chancel arch, and several windows in the south and west gable; the south door is defaced, but was pointed. There are corbels for a gallery at the west end. In the graveyard, to the south-east, is a remarkable altar, 10 feet 6 inches by 9 feet 6 inches, of large and well-cut blocks, with many rounded "cursing stones." The church is not far from the large stone fort of Cahercloggaun. *Founder*, St. Enda, of Aran, *c.* A.D. 500. "Killeny," 1302. *Description*, O'Hanlon, III., page 915 (illustration), R.S.A.I., 1900. (See Plates IX. and XI., fig. 12.)

¹ Similar modern crosses are illustrated in "Untrodden Paths in Roumania," by Mrs. Walker, p. 27; she also gives the type with the circle so common in Ireland.

13. **KILCORNERY**, Sheet 9.—*Parish church*. Nave, 39 by 20 feet; and chancel, 16 feet 10 inches square. It is much defaced, and has fine old masonry, probably of the tenth century, and fragments of a decorated south door, and an east window of *c.* 1080; the head of the window has a human face and rich foliage, and is curiously recessed. There is a plain late font. *Founder*, uncertain. "Kilcorny," 1302. *Monuments*, Comyn, 1714. *Description*, Keane, p. 368, R.S.A.I. (illustration), 1900.
14. **KILCOLMANVARA**, Sheet 9.—*Kilcornery Parish*. It was levelled before 1839. *Founder* uncertain.
15. **NOUGHAVAL**, Sheet 9.—*Parish church*. It is greatly overgrown. Nave and chancel, 53 feet by 21 feet 6 inches, and 28 by 21 feet. An early church with massive masonry, probably of the tenth century, but much repaired; the chancel arch has a semicircular head, and resembles that of Oughtmama and Dysert, being of finely cut blocks. The heads of the east and south windows appear to be ancient. There is a handsome pointed arched door, with a lintel and undercut ornaments, probably *c.* 1180, and some twelfth and sixteenth century windows. *Founder*, Mogua;¹ date and identity uncertain. Probably "the new chapel," 1302. "Nua Conghabhaile," "new monastery." "Nuoghevaell," 1584. *Description*, P.M.D., 1896, p. 238; R.S.A.I., 1900. (See Plates IX. and XI., fig. 7.)
16. *Same*, O'DAVOREN'S CHAPEL, Sheet 9.—*Noughaval Parish*. A vaulted oratory, near to and south-east from the last, 20 by 12 feet. The windows are oblong and chamfered; the heavy barrel vault has nearly fallen. A tablet recorded the building by the Davorens in 1725. This and the pointed south door have disappeared since 1839. An ancient-looking Celtic cross is set through the slab of an open-air altar, near the west gable; the octagonal pier of a market cross stands to the north of the great church. On the ridge to the east of this church lie a fine series of prehistoric stone forts, cairns, cromlechs, and souterrains extending to Ballyganner south.² The well and holy tree of St. Mogua lie to the north-east of the church.
17. **CARRAN**, Sheet 9.—*Parish church*, 56 by 20 feet. A late building of *c.* 1500. There remain an east window, a single pointed

¹ Perhaps Mochuda, *alias* Cronan.

² *Proc. R.I.A.*, vol. v., Ser. III., p. 544; *Journal R.S.A.I.*, 1897, p. 116.

slit, two south windows (one defaced, one with ogee head), a richly moulded, pointed south door, with a stoup in the right jamb; also three corbels at the east end of the north wall, which are carved with the faces of a king, a woman, and a warrior. The altar remains. The west gable had a bell chamber, and there is a machicolation at the north-west corner. South of the church is a small cairn, round which coffins are carried, and which probably gives the place its name.

- *Founder* unknown. "Carne," 1302. Well of Tobermacreagh lies to south. *Description* of parish, Mason, III., p. 281.

18. KINALLIA, Sheet 6, *Carran Parish*. A small oratory, 16 by 12 feet, with a featureless west gable and fragments of the side walls; the sill of the north window remains. Not far to the north is a large bullaun in the natural rock, and beyond it a well and altar; on the latter are several round stones, and a flat stone with two long round-ended depressions. To the south-west on the slope, under the cliffs of Kinallia, is the saint's cave, 15 by about 5 feet wide. *Founder*, St. Colman Mac Duach, c. 620: see his Life in Colgan. *Description*, Fahy, "Diocese of Kilmacduach," pp. 65, 67.
19. TERNON CRONAN, Sheet 10.—*Carran Parish*, 21 feet 10 inches by 12 feet 10 inches. A most venerable oratory in excellent preservation. The east window has inclined jambs and lintels; lines of roundels are cut in each jamb. The west door is also lintelled, and has inclined jambs; several corbels carved with heads project from the gable. The north door is late and pointed. In the graveyard are two curious tombs of two slabs pitched together, with end pieces similar to those at Slane, Co. Meath. The base and shaft of a plain cross stand on the ridge to the north-west. *Founder*, Cronan; identity uncertain. *Descriptions*, Petrie, p. 184; Dunraven, I., pp. 105, 107. (See Plate XI., figs. 4 and 8.)
20. SLADOO, Sheet 10.—*Carran Parish*. A rudely built late structure, all features destroyed; no trace of the alleged stone roof. *Description*, Handbook to Lisdoonvarna, "P. D."
21. GLENCOLUMBICILLE, Sheet 10.—*Carran Parish*. A separate parish in 1580. A defaced fifteenth-century church, much ivied and overgrown. The "finger-marks" of St. Columba¹ appear on

¹ MSS. T.C.D., F. 2, 14.

a rock near it. *Founder*, traditionally St. Columba, "Gleann Cholúim Chille," 1599 (*Annals Four Masters*). A separate parish, Glanecolmekill, 1584. *Monument*, O'Brien, 1753.

22. **TEMPLELINE**, Sheet 10.—*Carran Parish*. A rudely built late church, all the features destroyed.

BARONY OF CORCOMROE.

23. **KILLILAGH**, Sheet 8.—*Parish church*, 57 feet 6 inches by 19 feet. A late plain building, probably c. 1500. It has a southern side chapel, 17 by 22 feet. The east window is round-headed, and the west gable has a square bell chamber; the west and south walls have several plain, flat-headed and chamfered window slits; the south door is pointed. A beautifully chiselled round arch, with patterns punched on its blocks, leads into the side chapel, which has an ogee-headed light to the east and west, and a double window, with similar heads, to the south; its shaft is gone. *Founder*, probably St. Lonan, to whom the well is dedicated, c. A.D. 550. "Killadlagh," in 1302. *Monuments*, Queley, 1779; Davoren, 1784; Haverty and Kilmartin, 1794; Thynne. *Description*, R.S.A.I., 1900, p. 287.
24. **OWGHTDARRA**, Sheet 4.—*Killilagh Parish*. Only a few feet of the walls remain in a graveyard. *Founder* and age unknown. Possibly the "Wafferig," of 1302, and the Owghtory, of 1584.¹
25. **TOOMULLIN**, Sheet 8.—*Killilagh Parish*. A late church, probably c. 1480, 33 feet by 17 feet 6 inches. The east window has a single light, with a trefoil head, and triquetras in the spandrels of the outer face. There is a bell chamber on the west gable, and outside it a priest's room, with a pointed door. *Founder*, possibly Breacan, to whom the well is dedicated, c. 500. It was a separate parish, "Thuomlynn," 1302. *Description*, R.S.A.I., 1900, p. 287. View of interior, O'Hanlon, vii., p. 388.
26. **KILMACREWEHY**, Sheet 15.—*Parish church*, nave and chancel, 40 feet by 22 feet 6 inches, and 35 by 17 feet. It is built of flagstones, but part of the north wall is of large, early masonry, the rest being of the late fifteenth century. The east

¹ MSS. T.C.D., E. 2, 14.

window has two ogee headed lights, the shaft entire; the splay has a neatly built semicircular head. Traces of the altar remain. In the north wall is a tomb of very late decorated Gothic, with a mitred head, at the apex of the arch, two trefoil-headed arches, and a quatrefoil. There was a somewhat similar monument, with twisted columns, on the south side, but it has fallen. The chancel arch is rude and pointed, 13 feet 9 inches wide. The south porch has two plain pointed doors; there was a bell chamber on the west gable. *Founder*, Macreiche, c. 550; his mediæval "Life" says he built it in his old age. "Kilmaccrik," 1302. *Monuments*, O'Heo, 1642; Macdonough, 1745. *Descriptions*, Dr. Martin, R.S.A.I., 1872, 1873, p. 13; T. J. Westropp, R.S.A.I., 1900 (illustration), p. 290. (See Plate XII., fig. 3.)

27. **KILLASPUGLONAN**, Sheet 15.—*Parish church*. Totally levelled before 1839. *Founder*, Bishop Lonan, a friend of St. Maccreiche, to whom the well is dedicated, c. 550; "Killesconolan," 1302, cil easbuig lonain, 1599 (*Annals Four Masters*).
28. **KILSHANNY**, Sheet 15.—*Parish church*, 75 feet 10 inches by 20 feet 5 inches. Portions of the sides date probably about 1080; the north door and a slit window in the south wall belong to that period. The rest is late—the pointed west door, and the more eastern of the south windows (with three trefoil heads though the shafts and middle blocks lie on the ground) are of the later fifteenth century, and the eastern window still later, with two interlacing shafts and circular head pieces. The altar exists; there is a flat-arched long tomb recess to the right of it (in the north wall), and a round-headed ambrey to the south. *Founder*, perhaps Seanach, probably Senan's brother, 550. Traditional patron, Cuanna, identity uncertain; the saint's bell, now called (like the holy well) after St. Augustine, is in the British Museum¹; "Kilsanyg," 1302. In later times it was a cell of Corcomroe, or even a Cistercian Abbey, for Florence, its abbot, was bishop of Kilfenora, in 1273.² *Monuments*, Thynne, 1717–1752; Crowe, 1799. *Description*, Keane, p. 374, R.S.A.I., 1900 (with plan), p. 280.

¹ For a legend about St. Cuanna and a bell, see O'Hanlon, II., p. 285.

² Calendar of State Papers, Ireland, under the date.

29. **KILFENORA**, Sheet 16.—**ST. FACHNAN'S CATHEDRAL.** The nave is used as a Protestant church; the chancel is in ruins; they measure 67 feet 9 inches and 35 feet 9 inches long, being each 20 feet 9 inches wide. The east window, the south piscina, and north wing are of the later twelfth century, *c.* 1170. The pointed arcade of the nave is of the fourteenth or early fifteenth century, and there are several other features of the latter period. The east window has three semicircular lights; one capital has a group of little clerics. The north wing has plain, round headed window slits, and opened by pointed arches into the nave; one is closed by a fine monument of good decorated Gothic, the other by a low door. *Founder*, St. Fachnan, perhaps of Ross Carbery, *c.* A.D. 560. Kilfenora was annexed to the Archbishopric of Cashel in 1152. The name appears in the Book of Rights (450–902) in the name Cathair Fhionnabhrach, Fenabor in 1189, Funbranensis 1273, Fenaborens 1302. *Monuments*, cleric with supposed Celtic tonsure, bishop in full pontificals (later mediæval). A slab, with incised cross, forming the sill of the northern canopied monument. A beautifully decorated high cross, the fragments of a second, and two plainer ones, remain; another has been removed to Killaloe; and the site of a sixth is shown in the fields to the north of the village. Dean Lowe, 1638; Macencharni and O'Dea, 1650; Dean Blood, 1683–1700; Macdonough, 1685. The well of St. Fachtnan has an inscription of the Macdonoughs, 1684. *Descriptions*, Dunraven Notes, vol. II., (view); Fallon's "Cathedrals of Ireland" (view); Frost, p. 98 (view); R.S.A.I., 1900 (plan and three views); P.M.D., II. (1892), p. 38. The nave and crosses are vested as National Monuments.
30. **KILCARRAGH**, Sheet 16.—*Kilfenora Parish, hospital and church*, 26 feet by 14 feet 6 inches. A fragment stood 1839, now levelled.
31. **KILTONAGHTA**, Sheet 16.—*Kilfenora Parish.* Levelled since 1839.
32. **KILCAMEEN**, Sheet 9.—*Kilfenora Parish.* A burial ground and cist in a levelled caher near Ballykinvarga. *Founder*, possibly Caimin of Inniscaltra, *c.* 640. *Description*, R.S.A.I., 1897.
33. **KILMANAGHAN**, Sheet 15.—*Parish church*, entirely levelled. *Founder*, probably Mainchin, a friend of St. Maccreiche; the "Life of Maccrecius" attributes it to the latter saint, who built it at the "dun" of Baoith Bronach, king of Corcomroe, *c.* 570. "Kil-mankyn," 1302; Cil mainchin, 1573.

34. **ENNISTYMON**, Sheet 15.—*Kilmanaheen Parish* is said to have been the residence of Luchtighern in the "Life of Maccrecius," c. 540. This may have originated in a confusion of Inisdiomain with Inisidia or Moy. If not, the *founder* may have been Diman or Dioma.¹ The present ruined church is late, having been built in 1778.
35. **CLOONEY**, Sheet 16.—*Parish church*. The east gable and side walls remain; it was 19 feet 9 inches wide. The east and south windows have semicircular heads. *Founder*, probably Lonan, c. A.D. 550, to whom the well is dedicated. "Clonurpis," 1302; "Cluain," 1390.²
36. **KILLEINAGH**, Sheet 23.—*Clooney Parish*. Entirely levelled, graveyard remains.
37. **KILTORAGHT**, Sheet 16.—*Parish church*. Mr. J. Frost says this has been "utterly ruined," and Dr. G. Macnamara tells me that it was a modern church, but has been in ruins since before the present reign. Locally called Kiltorachtagh.
38. **KILMORE**, Sheet 24.—*Kiltoraght Parish*. Some enclosures and a rude dry stone altar, with small pillar stones, remain near Lough Fergus. One enclosure is called "Cashlaun Beannaighthe."

DIOCESE OF KILLALOE.

In this diocese we still follow the order from west to east, but are obliged to make two divisions. The first approximately covers the Dalcassian states, the second, the district of Corcovaakin; the latter possibly representing that part of the diocese of Iniscatha which lay in Clare, and is now included in the baronies of Ibricane, Clonderlaw, and Moyarta.

BARONY OF INCHQUIN.

39. **KILKEEDY**, Sheet 11.—*Parish church*, 60 feet by 20 feet. The east window is well executed; two broad ogee-headed lights (the shaft intact), with a well-cut semicircular head to the splay; its north jamb is ancient, probably of the late twelfth century; the rest of the building probably after 1500. Small "priest's dwelling," 19 feet by 16 feet, lies to the north. The font has a spiral

¹ "Annals of Four Masters," 1589.

² O'Brien's Rental, Trans. R.I.A., xv.

fluting. *Founder* uncertain, perhaps Caeide. "Kilquydi," 1302; Cil Caeidi, 1599 ("Annals, Four Masters"). *Monument*, Mullin, 1706. *Description*, Dwyer, p. 498. (See illustration, Plate XII., fig. 2.)

40. CUSHACORRA, Sheet 7.—*Kilkeedy Parish*. Some remains of an alleged convent.
41. TEMPLEMORE, or "MOOR" (KELLS), Sheet 17.—*Kilkeedy Parish*, 51 feet by 20 feet 7 inches. A very early church; the east and north sides have fallen. The west door has a lintel and inclined jambs; the south window is rudely built, with a semicircular head of one block. A souterrain remains near the east end. *Description*, R.S.A.I., 1894, p. 289. (See illustration, Plate VIII.)
42. ST. CATHERINE'S (KELLS), Sheet 17.—*Kilkeedy Parish*. Entirely levelled, and the graveyard is an orchard. Aenghus O'Daly, in 1617,¹ probably alludes to it when reproaching the people of Cealla (Kells) for "digging in the churchyard in the snow." *Description*, Dr. G. Macnamara, R.S.A.I., 1900, p. 31.
43. TEMPLEMADEIRKA, Sheet 18.—*Kilkeedy Parish*. The east gable and fragments of the side wall remain. The east window has two plain ogee heads; the shaft is gone. The building seems later than 1500, and evidently had a well-cut pointed south door, now lying in fragments among the graves.
44. SHAGHAVANOO, Sheet 18.—*Kilkeedy Parish*. Only a foundation; the head of a bossed Celtic cross and the holy bush which gives the place its name, remain near a large rath, with a souterrain. *Description*, Dr. G. Macnamara, R.S.A.I., 1900, p. 31 (illustration).
45. KILTACHYMORE, Sheet 10.—*Kilkeedy Parish*. Only part of the east gable remains, with very archaic masonry. O'Curry gives the ancient name as "Cil taice," without date or stated authority.
46. KILNABOY, Sheet 17.—*Parish church*. 63 feet by 20 feet 3 inches. The north and west walls are of early masonry, probably of the eleventh century. The low north door and tomb recess may be of the fourteenth century. There is a perfect sheelanagig over the south door. The east window is late. At the top is a small vesical ope, then two pear-shaped opes; below are three round-headed lights resting on a cross-bar; below this again are four

¹ Satirical poem on the Tribes of Clare.

oblong opes, the most northern cuts into the side pier; the head of the outer arch is pointed—the whole forming a late and most eccentric structure; it is ready to fall. The south windows very late, with brick arches. A fifteenth century ambry stands to the north of the altar; the panelled front slab of the latter remains. *Founder*, the anonymous Inghean Baoith (daughter of Baoith); date and identity uncertain. "Killinbynech," 1302; Cil inghine baoith, 1599 ("Annals, Four Masters"). *Monuments*: O'Flanagan, 1644; O'Nellane, 1645; O'Hehir, 1711; O'Brien of Cross, 1794. The tau-shaped termon cross still stands at Roughan; two other crosses marked the church lands at Crossard and Elmvale (Crossoughter). The termon lands are recorded in the "Book of Distribution," 1655. *Descriptions*: "Memorials of Adare," Dutton, p. 307; Dwyer, p. 492; T. J. Westropp, R.S.A.I., 1894–1900, p. 26; G. Macnamara, R.S.A.I., 1900, p. 26.

47. COAD, Sheet 17.—*Kilnaboy Parish*, 54 feet 3 inches by 22 feet. A late-fifteenth century church. The east window has two ogee heads (shaft gone), and a neat angular head to the splay. The south door is pointed; the south window has an ogee head; and the west gable has an arched bell chamber. The townland gives its name to Teige an Comhad, Prince of Thomond, 1459. *Monuments*, O'Brien of Lemaneagh, 1642; Power, 1673; Macnamara, 1722; MacGorman, 1735; Foster, 1756–1786. *Description*, G. Macnamara, P.M.D., III. (1896), p. 229; R.S.A.I., 1900. (See illustration, Plate XII., fig. 4.)
48. LEANNA, Sheet 17.—*Kilnaboy Parish*. It is now quite levelled, only the late jamb stones of an inclined door with hollow fluting at the angles, and a monk's head at the top remain. *Founder* unknown, "cil mhic ui donain," 1317¹ in "Leanana." Near it is an enclosure called the Friar's House (Tenambrawher on maps), and several bullauns. *Description* by G. Macnamara, R.S.A.I., 1897, p. 76. With two illustrations.
49. KILVOYDAN, Sheet 17.—*Kilnaboy Parish*. Entirely levelled, a few fragments of cut stone remain in the graveyard, and a curious door jamb, with a rude carving of St. Sebastian and rich fifteenth century foliage was removed to Corofin Chapel. In the field south of the graveyard are the socketted base and head of

¹ "Wars of Turlough."

an early cross ; the water in the socket "cures warts." *Founder*, Baighdean. Identity and date unknown. *Description*, G. Macnamara, R.S.A.I., 1900, p. 29.

50. **TEMPLEPATRICK (CORREEN)**, Sheet 10.—*Kilnaboy Parish*. The foundations of a small oratory, and detached priest's house in the "battle-field" at the foot of the hill at the entrance to Glenquin (Glencaoine), and below the stone fort of Cahermorc, (Lackareagh). To the west is the "well" of St. Patrick, a basin in a low ledge of rock.
51. **DYSERT-O'DEA, or DISKERT-TOLA**, Sheet 25.—*Parish church*. Nave and chancel, 71 feet by 23 feet 9 inches, and 21 feet by 25 feet. The south wall forms one line from the east gable to a projection to the west of the nave door. The semicircular chancel arch, and much of the north walls are probably of the later tenth century. The south door is of ornate romanesque workmanship (probably of the late eleventh century, and the middle of the twelfth century), and has been rebuilt (some voussoirs of another arch having been apparently inserted) in the south wall. It has a row of nineteen heads round it. One of the west windows has also been made of carved fragments from at least three other windows. The whole west end of the nave is late and embodies moulded blocks of the older church. The east window has three plain Gothic lights, chamfered and recessed, probably of the thirteenth century. The gable above the choir arch has a shapeless bell chamber with two pointed opes. A rude font and small cross remain in the graveyard. The *Round Tower* stands 7 feet 5 inches north of the north-west corner of the church. It is about 60 feet high, and 61 feet in circumference. The door is perfect with a semicircular head. The tower was built in offsets, like the tower of Ardmore, it has late Gothic battlements and window, and has been partly thrown down by lightning. A "brass" bell was found inside. In the field to the east of the ruins stands the beautiful high cross, probably of the late twelfth century. It was restored by Michael O'Dea in 1683, and Colonel F. Synge in 1871. The well of St. Tola is defaced, but still flows in a ditch. A double bullaun, extant in 1839, is not now discoverable. *Founder*, Tola of Clonard, died 735. Dysert was the chief sanctuary of the Muinter Iffernain or O'Quins. The fine bronze crosier is preserved in the collection of the Royal Irish Academy.

Monuments, Joan O'Dea, 1684; Neylane, 1728. *Descriptions*. Grose, vol. i., plates 3 and 4, p. xii; Dutton, p. 307; Brash, p. 58; Keane, p. 363; Dunraven, II., p. 38, p. 111; Dwyer, p. 495; Miss Stokes, plate xxxi.; T. J. Westropp, R.S.A.I. 1894, p. 150; G. Macnamara, R.S.A.I. 1899, p. 244. Numerous illustrations in last two; views in all the others except Dutton. Vested as National Monuments.

52. **MONASTERASHRADUFF**, Sheet 25.—*Dysert Parish*. Entirely demolished. A rude cross remained in 1839. It is also called Cil Lionain and "the Abbey of Shraduff or Temple Disert in Cottindisert" in 1611.¹
53. **KILCURRISH**, Sheet 25.—*Dysert Parish*. 21 feet by 12 feet. Only the west gable with a late pointed door is standing.
54. **TEMPLEDUFF (AUGHIM)**, Sheet 25.—*Dysert Parish*. A rude late building, 50 feet by 14 feet 6 inches, thickly ivied; late fifteenth century south door. The west gable and priest's house are levelled. It is called Temple Hugh O'Connell in the survey and maps of 1839; but this name is not known to the older peasantry.
55. **RUAN**, Sheet 25.—*Parish Church*, 55 feet 4 inches by 19 feet 6 inches. A very late fifteenth-century building. The east window has two pointed heads. The south door is pointed. A side building, 19 feet 6 inches by 16 feet 3 inches projects from the south-west angle. *Founder* unknown. Church not named in 1302. The place is called "Ruadhan, of the grasstopped hollow cahers" in 1317.* *Monuments*, O'Griffy, 1643; O'Kerin, 1687; Gorman, 1741. *Descriptions*, P.M.D., III. (1897), p. 398.
56. **KILVAKKEE**, Sheet 25.—*Ruan Parish*. Rudely built foundations remaining in Dromore.
57. **TEMPLENARAHNA**, Sheet 25.—*Ruan Parish*. Foundations of very ancient large masonry stand in a defaced caher.
58. **INAGH**, Sheet 32.—*Parish Church*. Fragments of the "Teampul na glas aighne" remained in 1839. Now demolished. *Founder*, Maccreiche, c. 580. His "Life" says he built the church in his old age. Eidnach, 1599 (*Annals Four Masters*).

¹ Grant to Sir E. Fisher, Patent Rolls (Ireland), Roll 9, James I.

* "Wars of Turlough."

59. **RATHBLATHMAC**, Sheet 25.—*Parish Church.* Nave and chancel, 42 feet 10 inches by 24 feet 8 inches, and 18 feet 4 inches by 20 feet. The south walls of the nave and chancel, the former with plinth and round corner shaft, and part of the north wall of the nave are of the late eleventh or earlier twelfth century. The sills of two early windows are set in the south wall of the nave. The more western is richly carved with foliage, dragons' heads, and a sheelanagig struggling with monsters. The second forms the sill of a late fifteenth-century window. The chancel arch is plain and pointed. The east and west gables are levelled. The south door has a stoup in its right jamb, and a carved block with roundels and interlacings. Keane says that the stump of a round tower was demolished in 1838. *Founder*, St. Blathmac, perhaps the poet, living c. 540 ("Life of Maccrecius"). His fine crosier and bell are in the museum of the Royal Irish Academy, "Rayth" 1302, "Prospect pleasing Rath" 1318.¹ *Descriptions.* Keane, p. 364; T. J. Westropp, R.S.A.I., 1894, p. 30 (with plan and illustrations); 1900.
60. **KILKEE**, Sheet 25.—*Rath Parish.* A graveyard in Cahercorcaun townland.
61. **KILNAMONA**, Sheet 33.—*Parish Church*, 68 feet 6 inches by 21 feet. The north wall has fallen: the church is plain, and dates circa 1500. The east window has a round-headed light. The south door is pointed and defaced. *Founder*, probably Laughteen, to whom the well is dedicated. The shrine of his arm (now in the museum of the Royal Irish Academy) was preserved at Kilnamona before it was removed to Lislachtin in County Kerry,² "Kynemua," 1302. *Monument*, Considine, 1687; P.M.D., III. (1896), p. 228.

BARONY OF ISLANDS.

62. **DROMCLIFF**, Sheet 33.—*Parish church*, 58 feet 6 inches by 20 feet. The south wall and windows are probably of the eleventh century, the east gable of the fifteenth, with a two-light window (the shafts entire); the head is ivied, but was probably trefoil-headed. The south door is well built, very slightly

¹ "Wars of Turlough."

² Bruodinus "Propugnaculum Catholicæ Veritatis."

pointed and late, with a curious thickening of the walls. The round tower stands due north from the church; it is 40 feet high, and 50 feet 6 inches in circumference. The door, 13 feet above the ground, and having a raised band round the sides and head, was extant in 1809; also two oblong windows, only one of which remained in 1839. *Founder* unknown. "Dromleb," 1302, Dromeliabh, 1389. *Descriptions*, Dutton, p. 307; Dwyer, p. 489; T. J. Westropp, R.S.A.I., 1894, p. 332. Vested as a National Monument. (See Plate X.)

63. ENNIS, FRANCISCAN FRIARY, Sheet 33.—*Dromcliff Parish*. The ruins consist of a nave, chancel, belfry, transept, three chapels, chapter-house, and domicile round an arcaded cloister. *Founder*, Donchad Cairbreach O'Brien, Prince of Thomond, about 1240. The side walls of the church belong to this period. It was restored by Torlough More O'Brien, Prince of Thomond, 1287–1306. The east window probably was of his restoration. "Math" Caech Macnamara built the vaulted refectory, or chapter-house, before 1314. The belfry, cloister arcade, and a side chapel, date from about 1400. The rest of the transept, with two chapels and the fine "MacMahon" tomb, were built about 1460; the latter by More ni Brien, wife of MacMahon, of Corcovaskin. The cross was destroyed and used as materials for a quay in 1711.¹ Manistir Innsi, 1240. *Monuments*, More ni Brien, c. 1460; Barons of Inchiquin, c. 1500; Teig O'Brien, c. 1590; O'Hehir, 1622; Considine, 1631, 1686; O'Kerin, 1687; Hickman and Colpoys, 1677; Macnamara, 1686; Woulfe, 1697, 1742; Banks, 1728, 1773; Gore, c. 1697; Stacpoole, c. 1745; Finucan, 1750; Roche, 1755; Power, 1761; Crowe, 1772, &c. *Descriptions*, Mooney, 1617; Wadding, 1634; Bruodin, 1643; Dyneley, 1680; Brigdale, 1695; Grose II., p. 42; Dwyer, p. 489; Frost, pp. 112, 114; T. J. Westropp, R.S.A.I., 1889, p. 44; 1895, p. 135, and 1900 (plan and illustrations); P.M.D., 1895, p. 34 (illustration). Vested as a National Monument.
64. TEMPLEHARAGHAN, Sheet 33.—*Dromcliff Parish*. Now entirely demolished; it stood in a fort now nearly levelled.
65. KILQUANE, Sheet 33.—*Dromcliff Parish*. Entirely levelled site, marked by a graveyard.

¹ Dwyer, p. 491.

66. **KILMALEY**, Sheet 40.—*Parish church*, 67 feet 6 inches by 20 feet. The east gable and south wall remain, and date about 1450. The east window has two trefoil heads (shaft gone); the iron staples of its shutters remain, and a "Patrick's cross" is cut on the jamb. The splay has a well built semicircular head. The plain south door has a stoup in the outer right jamb. *Founder*, probably Screbanus; identity and date unknown; perhaps the "Sribanus" in the 1302 list; "Kellmaley," 1302. *Monuments*, Burke, of Strasburg, County Clare, 1780, &c.; see P.M.D. (1897), p. 396.
67. **KILLONE**, AUGUSTINIAN CONVENT OF ST. JOHN, Sheet 41. The ruins consist of a church, crypt, and domicile round a cloister garth. The east window has two beautifully built lights, having semicircular heads, with raised chevrons and lozenges, and dating about 1180. The double north window is of the fourteenth century. Font remains. West gable has a bell-chamber; the pointed arch is made of pitched slabs, cut out in curves. The well of St. John lies to the east of the convent. The altar was built 1731 by Anthony Roche; it has round stones laid on it; there is also a bathing tank. *Founder*, Donald More O'Brien, c. 1180. "Kellonia," 1189.¹ *Monuments*, Lucas, 1759; Daxon, 1800; Macdonnell, 1793. *Descriptions*, Dwyer, 491; T. J. Westropp, R.S.A.I., 1900, p. 126 (illustrations, plan, and section); P.M.D., III. (1897), p. 395. Vested as a National Monument.
68. **CLARE**, AUGUSTINIAN ABBEY OF SS. PETER AND PAUL) "DE FORGIO," Sheet 33. It consists of a church and domicile round a cloister garth. The fabric chiefly dates 1189: but there are late fifteenth-century details. *Founder*, Donald More O'Brien, on site of Kilmoney; his charter dates 1189, and another confirming it in 1461. *Monuments*, Hallinan, 1692; Haugh, 1726; Hassett, 1786; Costelloe, 1788. *Descriptions*, Grose, II., p. 80; Frost, p. 121; T. J. Westropp, R.S.A.I., 1892, p. 78; 1900, p. 118 (Plan and illustrations). Vested as a National Monument.
69. **KILLUR**, Sheet 33.—*Clare Abbey Parish*, Sheet 33. A small church, 37 feet 9 inches by 19 feet 4 inches. East window has a slightly pointed head, and is chamfered; the splay is rudely

¹ Charter of Clare Abbey.

built, and the other features defaced. *Founder*, Lugad; perhaps Molua. "Killuga," 1302, then a separate parish. *Monuments*, Stamer, 1766; P.M.D., III. (1897), p. 392.

70. CLONDEGAD, Sheet 50.—Old church destroyed. Present one modern, 1700, rebuilt 1809, and in ruins. *Founder*, Screbanus; his "bed" is a hole in the cliff over the neighbouring stream. "Clondagah," 1302. *Monuments*, Ross and Harrison, 1700; Smith, 1711, &c.

BARONY OF BUNRATTY, UPPER.

71. INCHICRONAN, AUGUSTINIAN MONASTERY, Sheet 26.—*Parish church*, 66 feet by 16 feet 6 inches. A church with a south transept, a sacristy, and a small domicile. The east end dates from about 1080; the window has a beautifully built splay, with a semi-circular head. The outer face has a well-cut spray of foliage under an A hood moulding. The transept is of fine early fifteenth-century work, with two arches opening from the church. An enclosure, with a pointed gateway, lies to the east. *Founder*, Cronan, perhaps of Tomgraney, c. A.D. 550—King Donald More O'Brien is said to have established the Augustinians here. He granted it as "Insula S. Cronani" to Clare Abbey in 1189. "Inchigronayn," 1302. *Monuments*, Butler, 1735. *Descriptions*, Report of the Board of Public Works, 1879–80 (illustrations); T. J. Westropp, R.S.A.I., 1900, p. 133 (plan and views). Vested as a National Monument.
72. KILVOYDAN, Sheet 26.—*Inchicronan Parish*. There only remain a well and graveyard; in the latter is a bullaun. A dolmen stands on the neighbouring hill.
73. KILTOOLA, Sheet 18.—*Inchicronan Parish*. A church with late fifteenth-century details. The south wall leans out. *Founder*, probably Tola. "Kellsuvleg," 1302. An independent parish, and so continued to 1590.
74. TEMPLEMALEY, Sheet 25.—*Parish church*, 54 feet 6 inches by 18 feet 9 inches. It is rudely built, and probably dates from about 1080; the windows belonging to that period. One seems still earlier, having an angular head of two slabs (Plate XI., fig. 1). A souterrain lies not far from the west end of the ruin; but the new river-bed of the Fergus has been cut between them. *Founder* unknown. "Inalli," 1302; "Temple Imayle," 1584.¹

¹ MSS., T.C.D., F. 2, 14.

75. **KILRAGHTIS**, Sheet 26.—*Parish church*, 63 feet 4 inches by 17 feet 9 inches. A late fifteenth-century church, well built and perfect. The east window has two lights, probably trefoil-headed, but thickly ivied (shaft remains). The south door is slightly pointed. Not far to the north is the dolmen of Ballymaconna. *Founder* and origin of name unknown. "Kilrathusa" in 1302; "Cil reachtais," 1601 ("Annals of the Four Masters").
76. **CLOONEY**, Sheet 34.—*Parish church*, 45 feet 6 inches by 20 feet. The south door is pointed. The sides and west end probably date from the fifteenth century; the east end is late. A capital and another carved fragment are built into the south wall (Plate XII., figs. 5 and 6). *Founder*, traditionally, Rikin or Brecan, c. 500. "Cluaine," "Clony," 1302.
77. **CARNTemple**, Sheet 34.—*Cloney Parish*, 20 by 10 feet. The very ancient and massive foundations of an oratory (some of the stones over 6 feet long) in the townland of Noughaval, and called Carntemple. It marks the site of Kilbreacan, one of the first mission churches of Thomond. *Founder*, Brecan, c. A.D. 480. "Kellbrakyn," 1302, being then a separate parish.
78. **DOORA**, Sheet 33.—*Parish church*, 58 feet 6 inches by 23 feet 8 inches. A very ancient church "cyclopean" masonry. The side walls and south windows probably date from the early eleventh century. The east window has two lights; the southern is of sandstone, with a semicircular head boldly moulded, and of the same period as the south window; its other light is a close copy in limestone. The north door is lintelled, but does not incline. There are two curious corbels in the south wall. *Founder*, St. Brecan, c. A.D. 500. "Durrinierekin," in 1189; "Dubdery," in 1302; "Dura," in O'Brien's Rental, 1380: "Dubhdoire,"¹ in the Life of St. Brendan MacFinloga. *Descriptions*, Dwyer, p. 486; T. J. Westropp, R.S.A.I., 1900 (views and plan).
79. **KILLAVELLA**, Sheet 34.—*Doora Parish*; near it is the well Toberineenboy.
80. **SPANCEL HILL**. O'Donovan identifies the Abbey of Drom Urchaill, A.D. 837 ("Annals of the Four Masters"), as at this place. It is probably some other place of the name. No such site is known near Spancel Hill.

¹ Betham MSS., vol. v., R.I.A.

81. QUIN, ST. FINGHIN'S CHURCH, Sheet 42.—*Parish Church*, 79 by 27 feet. A Gothic church, built probably about 1280, with a later belfry tower. The east window is a triple lancet, the south window richly moulded. *Founder*, Finghin; identity doubtful. The well Toberinghine is dedicated to Inghean Baoith. "Cuinche," in 1110, was adopted by the Synod of Rathbreasail as a boundary mark for the diocese of Killaloe and that of Limerick. "Cil Cuinche" was burned by the Irish over De Clare's soldiers in 1279. *Description*, R.S.A.I., 1900, and a view, R.S.A.I., 1890, p. 292. (See Plate X.)
82. QUIN, FRANCISCAN FRIARY, Sheet 42. The building consists of a nave, chancel, transept, and belfry, with domestic buildings round an arcaded cloister; a hospital, or guest house, and the foundations of other buildings. It rests on the foundations, and retains some of the walls and bastions of Thomas De Clare's "round towery castle," 1280. This was destroyed by Cuvea Macnamara about 1286, and was adopted as an abbey before 1350.¹ *Founder*, probably Maccon Macnamara. It was rebuilt by Sioda Cam Macnamara, 1402, to which period the cloister and vaulted rooms belong. It was further repaired and enlarged, probably on its reform, by Maccon Macnamara, 1433 (under papal license). The transept, belfry tower, and most of the details of the upper rooms date from this time. *Monuments*, Odo Macnamara, c. 1500 (a neat canopied tomb); John Macnamara (chief), 1601; Donough Macnamara, 1654; Tiege Macnamara, of Rannagh, 1714; Macnamara, of Ballymarkahan, 1722; Edmund Macnamara, 1761; and many others of this family; Molony, 1748; Scanlan, 1771; Stamer, 1799; Lords Dunboyne; Rev. John Hogan, the last friar, 1820. There is also a curious piece of stucco-work, probably c. 1645 (sketched by Dyneley, 1680). *Descriptions*, Dyneley (1680), R.S.A.I., 1866 (illustrations); Bishop Pococke's "Tour"; Grose, vol. ii., p. 69 (illustration); Lady Chatterton's "Rambles in the South of Ireland"; T. N. Deane, Proc. R.I.A., 1882 (plan); T. J. Westropp, R.S.A.I., 1888, p. 334; 1894, p. 83; 1900 (plans and illustrations); N. C. Macnamara, "Story of an Irish Sept," pp. 104, 142, 144, 200; Report of Board of Public Works, 1881, 1882, p. 89 (plan and illustrations); Dwyer, pp. 483, 536; Frost, p. 50 (illustration). Vested as a National Monument.

¹ Wadding, "Annales Minorum," vol. iii., p. 574; larger edition, vol. viii., p. 47; and vol. x., p. 218.

83. DANGANBRACK, Sheet 42.—*Quin Parish.* "Dangynbrecach," a separate parish, 1302. Site forgotten.
84. SHANKILL, Sheet 34.—*Quin Parish.* A graveyard and fragments of a church near Dangan Ivigen.

BARONY OF BUNRATTY LOWER.

85. KILMALEERY, Sheet 51.—*Parish church*, 38 by 15 feet. It was evidently rebuilt late in the eighteenth century. *Founder* unknown. Kilmalitrie, 1302. *Monuments*, Mac Mahon, 1733; P.M.D., III. (1897), p. 399.
86. KILNASOOLAGH, Sheet 51.—*Parish church.* Fragments of late mediæval windows remain; the present building is late. *Founder* unknown, but a pattern was held at Newmarket on Easter Monday. "Kellomssolech," 1302; "Cil Subhalaigh," 1317.¹ *Monuments*, Colpoys, 1684. Sir Donat O'Brien, bart., 1717 (P.M.D., II. (1894), p. 51, III. (1897), p. 399, and R.S.A.I., 1890, p. 76), Blood, 1799, &c.
87. KILKEARIN, Sheet 42.—*Kilnasoolagh Parish.* Entirely levelled.
88. TOMFINLOUGH,² Sheet 42.—*Parish church*, 71 by 25 feet 6 inches. The side walls are very early, of large "cyclopean" masonry in parts; two windows remain, one flat-headed, with inclined jambs; the other is recessed, and has a semicircular head, probably of the eleventh century. The church was evidently partly rebuilt about 1300, perhaps by the English settlers under the De Clare. It had a plain three-light east window, and a richly moulded pointed double-light south window, the capitals carved with leaves (see Plate XII., fig. 2), and the hood resting on faces, two pointed heads, and a central detached shaft with moulded bands (now fallen). A well-moulded ambry remains in the south-east corner. The older east window is now defaced by a well-made late fifteenth-century one, with semicircular headed splay and two trefoil-headed lights (shaft intact), with a square hood. The west gable is badly breached; near it are corbels marking the position of a gallery, which was reached by a door (about 7 feet above the ground)

¹ "Wars of Torlough."

² MSS. R.I.A., 23 L. 22, p. 424, an ancient account of Tomfinlough, in Thomond.

in the north wall. The south door is defaced. The "plague stone" with raised circles, one forming a Celtic cross, is built into the wall: it is said to have kept pestilence from the parish even at the time of the great cholera. *Founder*, St. Luchtighern, son of Cutrito, *c.* 550.¹ The place was a monastery, and was ravaged in the Danish wars. "Tuaim Fionlocha," 944 (*Annals Four Masters*). "Thonmynloka," 1302, now passing into "Fenloe." *Monuments*, Hewson, 1722, P.M.D., III. (1897), plate ii., p. 385.

89. *Same*, ORATORY.—To the south-east of the last. Only the end wall remains, having a door with lintel and inclined jambs, and above it three corbels with human faces. A very early building. It is 12 feet wide externally. (See illustration, Plate XI., fig. 10.)
90. CLONLOGHAN, Sheet 51.—*Parish church*, 53 by 15 feet. The west end had fallen before 1839. Now only the east gable and portions of the sides remain. It is a very ancient oratory, perhaps of the tenth century. The east and south windows have inclined jambs (Plate XI., figs. 2 and 3), the former having a semicircular head, the latter a lintel. *Founder* unknown. "Clone . . . kilthany," 1302. As "Killtheany" is Killeany, 1189,² perhaps Clonloghan was founded by Enda.
91. KILCONRY, Sheet 61.—*Parish church*. 55 feet 7 inches by 17 feet 9 inches. A late fifteenth-century church: the east window has two pointed lights; the south window is also pointed, and the splay has flat arches. The door was to the south: the west gable is breached. *Founder*, traditionally St. Cannara, a contemporary of St. Senan, *c.* A.D. 550. "Kellchoniry," 1302. The compound is probably Conaire.
92. DROMLINE, Sheet 51.—*Parish church*, 72 by 21 feet. The west gable, much of the south wall, and the east window have been destroyed. *Founder*, possibly Sanctain, son of Samuel the low-headed,³ date unknown, who was of Drum Laigill, in Tradree. "Drumliligil," 1302. Drum Laighean ("Annals of the Four Masters"), 1593.

¹ "Calendar of Oenghus," p. 85, April 30th.

² Charter of Clare Abbey.

³ Calendar of Oenghus, p. 85, May 11th.

93. **BUNRATTY**, Sheet 62.—*Parish church*, 66 by 26 feet. A late building, much probably as late as the sixteenth century. The east window is rectangular and defaced; the south wall has two single lights, one with a late ogee head, and a third window with three rectangular opens (shafts intact). There is a neat, well cut, pointed south door (Plate XII., fig. 8). *Founder* unknown. "Bunraite" (Dr. Todd reads "Buntradraighe") is named, in the tenth century;¹ "Bunraht" charter 1189. The place was the chief town of the De Clares, 1276–1318. *Monuments*, P.M.D., III. (1896), p. 226.
94. **BUNRATTY CASTLE**, Sheet 62.—There is an oratory in the south-east tower of the castle. It has a piscina, and the ceiling is stucco, richly moulded, probably made by Donough, "the great Earl" of Thomond, 1610.
95. **FEENAGH**, Sheet 52.—*Parish church*, 56 by 18 feet. 15th century; the east gable has fallen; the south door had a semicircular arch, and an ogee-headed stoup. The window has an ogee head. *Founder* unknown. "Fudach," 1302. *Monuments*, Hensey, 1717, 1760; Garvey, 1776, 1793; Cusack, 1788.
96. **KILMURRY NA GALL**, Sheet 42.—*Parish church*. 21 feet of late masonry of the north wall stood in 1839; it is entirely levelled. *Founder*, probably the English of Bunratty before 1318,² whence probably its epithet "of the foreigners." It is not named in 1302. "Kilmoor," "it pertained to Killaloe anciently," 1615.³
97. **KILFINAGHTA**⁴ (BALLYSHEEN), Sheet 52.—*Parish church*, 63 by 22 feet. An ancient church, dating probably about 1080. The west gable was standing in 1839, but part of the north wall had then fallen; the gable has since collapsed. The east window is defaced, ivied, and built up; the large semicircular-headed splay has mouldings and bases; to the right are two moulded ambries, cut in sandstone, the upper with an angular

¹ "Wars of the Gaedhill with the Gaill."

² Lands in Kilmurry Parish belonged to Thomas De Clare at his death, 1287. It may even be included among the ten advowsons in his gift, despite its omission in 1302. The Commissioners may have regarded its recent and 'foreign' origin as excluding it from the list of recognised parishes. Mr. Frost's "History," p. 59, regards Faicile, the patron saint of Atheliath, in Galway Bay, as the older patroness of Kilmurry Church, the well being Tober faicile.

³ Dwyer, p. 89.

⁴ So named in Petty's Map.

head (see Plate XI., figs. 5, 9). Two of the south windows are of sandstone, recessed, and with round mouldings, semicircular heads, and inclined jambs¹ (Plate XI., figs. 5 and 9); the third is plain, with inclined jambs. The south door is slightly pointed, and has an ancient corbel with a human face cut in sandstone above it. The masonry throughout is small, bad, and decayed. *Founder* unknown. "Kilfinity," 1302. *Monuments*, Cruice, 1600; Rodan, 1619; Rochford, 1723. P.M.D., II. (1894), p. 448, &c.

98. **SIXMILEBRIDGE.**—*Kilfinaghta Parish*. It is alleged in "Hibernia Dominicana"² that a house of Dominicans stood near this place. No ruin or site is remembered. There is a graveyard attached to the Protestant church, which is at least as old as the Restoration. *Monuments*, Cotter, 1679; Vandeleur (vault), 1685; Westropp (vault), 1698, 1781; Hickman, 1771.
99. **KILFINTINAN**, Sheet 52.—*Parish church*, 32 feet by 16 feet 6 inches. A late looking church. All the features were defaced before 1839; the west gable had fallen. *Founder*, some suppose Senan, like at Kiltinanlea. "Kilhyntina," 1302. It was then in Limerick diocese. "Cil fin Tinain" in a deed, 1620.³ The Rev. Jasper White, in 1658, writes:—"The parish church of Kilienaghta (*sic*) was the chapel of St. Thomas on the mountain at a place called Ballybuchalane, near Cratloe"—now Ballybroughane, in which the ruin stands.
100. **CRUGHANE**, Sheet 62.—*Kilfintinan Parish*. 65 feet by 20 feet 8 inches. A fifteenth-century church. The west gable had fallen before 1839; the east gable had then a pointed window, much broken, and has since fallen. The slightly pointed door and window remain in the south wall. The Rev. Jasper White says it was the parish church of Kilfintinan in 1658. *Founder* unknown. *Monuments*, Reddan, 1705. Blood, 1738; Maghlin, 1761; Nugent, 1770. P.M.D., II. (1894), p. 447. Ballinphunta dolmen stands near the south wall of the graveyard.⁴
101. **KILLEELY**, Sheet 62.—*Parish church*, entirely levelled. *Founder*, St. Elia, or Lelia,⁵ sister of St. Mainchin, c. 550. Her day was August 11th.

¹ The one figured has recently been destroyed by a falling tree.

² "Hibernia Dominicana," p. 213.

³ Trans. R.I.A. xv.

⁴ Borlase's "Dolmens of Ireland," vol. i., p. 86.

⁵ Rev. Jasper White's Manuscript, 1658.

102. **KILCREDAUNADOBER**, Sheet 62.—*Killeely Parish*. Entirely levelled.
103. **CRATLOE**, Sheet 62.—*Killeely Parish*, 57 by 21 feet. The gables are levelled to the height of the sides. A fluted basin of a piscina remains in the south wall. It and the adjoining well are dedicated to St. John, and it appears to be a very late building. This place was called "Cretsallach" in A.D. 845 in "The Circuit of Ireland."
104. **KILQUANE**, Sheet 62.—*St. Munchin's Parish*, 36 feet 6 inches by 17 feet 6 inches. The church is very much defaced and ivied; the walls are of large masonry. The east window is hidden in knotted ivy. The side walls are breached, the west gable featureless, and the south door injured. *Founder*, Cuanna. The Abbot Covanus.¹ "Kilcohan," 1302. *Monuments*, Macadam, 1708, P. M. D. II., 1894, p. 452, &c.
105. **KILRUSH (OLD CHURCH)**, Sheet 62.—*St. Munchin's Parish*, and in the Liberties of Limerick, 30 feet 6 inches by 19 feet. A very ancient church. The east window is round-headed, the door has a lintel, and both have inclined jambs. The south window was destroyed, and in its space Mr. Robert O'Brien of Oldchurch inserted a window with a late and enigmatical inscription (of the Quinlinan family) which had been found in the city of Limerick. *Founder* unknown. "Kilrussech," 1302.

BARONY OF TULLA UPPER.

106. **TULLA**,² Sheet 35.—*Parish church*. A portion of the north wall remains, about 5 feet high, and with the chamfered edge of an ambry. South of it is the ruined seventeenth century church, with a barrel-vaulted chancel. The east window and three south windows are round-headed, and the west door pointed. *Founder*, Mochulla; date and identity uncertain. "Tulach," 1302. "Tullach na neaspuig," 1317. "Tullynenaspill,"³ 1604. *Monuments*, Molony, 1702; Harte, c. 1710; Mac Mahon, 1711; Browne, 1717; Westropp, 1762; O'Callaghan, 1792; P. M. D., III. (1896), p. 236 (1897), p. 400, &c.

¹ Rev. J. White's MSS., 1658.

² MSS. T. C. D., i. i. 2, states that Tullanaspull of the Colidei was built by Convarn (Cumara? or Cuvea?) Macnamara, then Lord of Clancullen, and granted to his son Teig, a priest, about 1367.

³ MSS. R. I. A., 14 B. 18, p. 257.

107. KILNOE, Sheet 28.—*Parish church*. Entirely levelled before 1839.¹ Not named in 1302. The well is dedicated to Mochulla.
108. FEAKLE, Sheet 28.—*Parish church*. One gable stood in 1780.² It stood to the south of the modern church, and where the Burke monument remains. *Founder*, Mochonna or Cuanna, perhaps of Kilshanny and Kilquane, called Mochonna of Moynoe in the Calendar of Oengus, March 29th. "Fichell," 1302. *Monuments*, Burke, 1779. P. M. D., III. (1897), plate 2, p. 385.
109. FAHY, Sheet 19.—*Feakle Parish*. Only fragments of the wall remain, and a rock basin called a well; not far away are the curious cromlechs and rock markings of Dromandoora.³
110. TOMGRANEY, Sheet 28.—*Parish church*, 75 feet 4 inches by 21 feet 4 inches. An unusually fine example of a nearly uninjured church of the tenth and eleventh centuries still used for worship. The west door, antæ, and wall (except the upper part of the gable) are of large "cyclopean" masonry, *ante* A.D. 969. The door has a lintel and inclined jambs, with a flat raised band round it. The south lights are plain rectangles, with low mouldings. The more eastern part of the church is of regular coursed masonry, with a plinth and corner shafts, the north and two south windows being richly decorated. There is also the head of a richly carved window in the south wall; the east window has round angle shafts inside; the light has been rebuilt. Several carved fragments, two faces, &c., appear in the walls. (See Plate XIII.) There was a round tower here; some tradition of it subsisted in Petrie's time; but when Brash visited the place nothing remained. The "cloghlea," a tall limestone pillar, split, but held together by ivy, marks the bounds of the old termon and modern glebe. A holy well of St. Colan of Iniscaltra (died 552) remains farther westward. *Founders*, Cronan and Colan of Iniscaltra, *ante*, 550. The records of the church commence in 735—"Tuaim Greine." It was rebuilt by the Abbot Cormac O'Killeen, who died 969, and again by Brian Boru, King of Ireland, about A.D. 1000. The Ordnance Survey Letters describe it as modern! *Descriptions*, Dunraven, I., p. 182; Dwyer, p. 475.

¹ Lewis' "Topographical Dictionary" says:—"The ruins of the old church remain," 1837; but this is probably inaccurate.

² Ordnance Survey Letters, R. I. A. MSS., 14 B. 23, p. 174.

³ Proc. R.I.A., vol. x., p. 441, and vol. iv., Ser. III., p. 546.

111. KILLANA, Sheet 36.—*Tomgraney Parish.* A graveyard with some blocks of cut stone traditionally belonging to a church.
112. MOYNOE, Sheet 29.—*Parish church.* 60 feet 9 inches by 23 feet 9 inches. Only the eastern gable and fragments of the adjoining-walls remain. The window has two high Gothic lights, and probably dates about 1280. *Founder*, Caimin of Iniscaltra is said to have founded Maghneo n-Oirbriughe about A.D. 630. Mochonna was also of Magheo. The burning of its precinct in 1310 precipitated the civil war, 1311–1318. It was then the chief sanctuary of the O'Gradys of Cinel Donghaile. "Mago," 1302.
- 113 to 119. INISCALTRA¹ (HOLY ISLAND), LOUGH DERG, Sheet 136 of Co Galway.—An important group of churches founded by Caimin (half brother of Guaire "the hospitable" chief of Hy Fiachra Aidhne) before A.D. 640. However, we find earlier records, such as the death of Colan of Iniscealtra, A.D. 552. Probably Caimin may have founded the stone churches. The place was an important monastery and school, Caimin having been a learned scholar and acquainted with Hebrew. Lying on a great waterway, the island suffered much from the Norsemen. It was called Inis Celtra in 838. In A.D. 922 the Danes ravaged it and "drowned its relics and shrines." Brian Boru restored its churches, *circa* A.D. 1000. "Inysgeltra," 1302. The parish was eventually partly given to County Galway, but always remained part of the see of Killaloe. The island, which was popularly regarded as part of County Clare, was formally

¹ In the Ordnance Survey Letters of Galway (MSS., 14 D. 2, R. I. A.), Nov. 19th, 1838. The names of the churches given in the descriptions (which are very carefully written) and the sketch map of Iniscaltra are different from those in the published maps of the Ordnance Survey. The nameless site on the map to the west of the round tower is "Garadh Mhicheail" on the sketch map and "the church of St. Michael" in the Letters. The "church and garden of St. Michael on the Ordnance Survey Maps are "The Baptism Church" of the sketch maps and Letters. The "Church of Baptism" on the Ordnance Survey Map is the "church of the wounded men" of the sketch map and Letters. I found on my first visit in 1877 that St. Caimin's and St. Mary's were the only church names known to my boatman. Again, in 1885, I was assured that the church near St. Mary's was not known as St. Michael's, so I take this opportunity of marking this gross inaccuracy of the 1839 map—a fault so unusual in the noble series of maps of the period.

² "Wars of the Gaedhil with the Gaill," p. 13.

restored with the remainder of Iniscaltra parish and that of Clonrush in 1898. *Monuments*, a group of tombstones from the eighth to the eleventh century, with incised crosses and many Irish inscriptions. O'Grady (restored the churches), 1708, in St. Caimin's church. Sir Torlough Mac Brien Arra, Baronet, 1626, in St. Mary's church. Remains of three early Celtic crosses, one with the epitaph, "Ilad in dechenboir." *Descriptions*, Dyneley, 1681; R. S. A. I., 1864, p. 82; Petrie (views), pp. 281-284; Brash, p. 17; Dunraven, II., pp. 3-5, and 56-60 (views and plan); Miss Stokes (Plates xxv., xxxviii.); Lenihan, R. S. A. I., 1889¹; Report of the Board of Public Works, 1879-80, p. 73 (plans and illustrations). They have been vested as National Monuments.

113. *Same*, TEAMPUL CAIMIN.—Nave and chancel 30 feet 6 inches by 20 feet and 14 feet 7 inches by 12 feet 6 inches. An ancient church of the ninth or tenth century, with inserted chancel arch, probably *circa* 1000, and west door of somewhat later date. The original building has antæ at the gables and two ancient south windows (figured by Petrie), with inclined jambs, the lights respectively lintelled and with semicircular head. The chancel arch has clustered pillars and three plain orders, with a head in high relief on the keystone. The chancel gable and east end were levelled, the sides have a neat external cornice; the east wall and altar have been rebuilt in 1879. To the south east of this church is a beautifully built round tower, about 80 feet high and 46 feet in girth. The round-headed doorway is entire and once had an "iron" door. St. Caimins was called St. Columbcille's chapel in 1838.²
114. *Same*, TEAMPULL NA BFEAR NGONTA.—"Church of the wounded (¶slain) men," 10 by 15 feet. A defaced little chapel, standing in the ancient burial enclosure to the east of St. Caimin's Church. The enclosure is entered by a semicircular-headed archway (rebuilt from the original blocks in 1879), and contains a large number of inscribed and cross-marked alabs, and the base of the larger cross.

¹ Care must be taken in consulting this Paper to bear in mind that, besides other inaccuracies, Temple Caimin is called "St. Mary's."

² Ordnance Survey Letters of Galway, MSS. 14 D. 2, R. I. A., p. 545.

115. *Same*, "CONFESSORIAL," externally 10 feet 6 inches by 8 feet 6 inches. A small oblong cell north of the cemetery. There is a recess at the west end, and the doorway faces the east; it is filled with large plain slabs.
116. *Same*, ORATORY. A mere foundation to the north-east of the last.
117. *Same*, St. MICHAEL's, 6 feet by 4 feet 6 inches. An oblong foundation and enclosures west of St. Caimin's, and on the summit of the island.
118. *Same*, "BAPTISM CHURCH" (marked on the map as "St. Michael's"), 19 feet 10 inches by 11 feet 9 inches. Its foundations alone remained with the low north wall when I first visited it in 1877. In 1838 the east gable and its defaced window and a south window remained, but they fell in a great storm January 6, 1839, as O'Donovan notes that year on the original letter "how soon a piece of writing becomes an antiquity." The south window was a small oblong slit. In 1879 the rich semi-circular-headed west door of three orders, the inner piers covered with chevrons, was recovered and rebuilt. The round-headed gateway of the enclosure was also rebuilt.
119. *Same*, St. MARY's, 54 feet 9 inches by 22 feet 2 inches. A large church; an early semicircular-headed window has been rebuilt in the south wall; the west door is late, plain, and pointed. The head of the double east window is of the fifteenth century, a corbel with a face, an elaborate but very late altar, a cross-scribed slab, &c., remain. St. Mary's well lies to the east of this church on the shore of the lake.
120. CLONRUSH, Sheet 137, Galway.—*Parish church*, 49 by 18 feet. The western gable had a door, but has long since fallen. The south wall was much decayed in 1838, and the foundations picked out. A round-headed arch, 7 feet high, stood at the south-west angle projecting from the building. The east windows had two ogee heads (shaft intact); the south window had a flat lintel inside; the head was ivied. The people called the ruin Meelick Abbey. Eastward lay a ruin called "Tenambragher," a priest's house, 25 feet by 13 feet 4 inches. The north-west and north-east angles and two fragments of the south wall remained. The "poll cholomhain" (poul cluman) or sacristy lay to the north-east. It is a small stone-roofed cell, 7 feet 6 inches by 4 feet 6 inches and 6 feet 3 inches high, with a square-headed slit in the east

wall. The marks of Colman's knees were shown in the flags of the floor. When he knelt there he could hear mass at Rome. *Founder*, Colman; identity uncertain.

121. **ILLAUNMORE, Clonrush Parish.**—A church foundation, 34 by 20 feet. Two cross-scribed slabs remain at the east end. Traditionally said to have been a Franciscan friary.

BARONY OF TULLA, LOWER.

- 122 to 124. **KILLALOE, Sheet 45, Clare.**—A cathedral and two stone-roofed oratories built in the neighbourhood of the early palaces of the Dalcassian kings, Torlough, *c.* A.D. 650; Lachtna who built Grianan Lachtna on the slope of Craglea, *c.* A.D. 840; Mahon and Brien at Beal Boroimhe, "Boruma Fort," *c.* A.D. 950, and Kincora probably in the present "town." *Founder*, St. Molua or Lugad, was abbot, and gave his name to the place, *c.* A.D. 650. St. Flannan, son of King Torlough, was the first bishop and patron of the larger oratory and cathedral, A.D. 640–690. Brian Boru re-edified the churches, *c.* 1000. Murchad O'Brien also restored them, *c.* 1080. Donald More O'Brien, King of Munster, built the cathedral in 1182. Since which time the only addition seems to have been the upper part of the belfry by Bishop Knox in the present century. Latin name, "Laonensis"; Irish, "Cil da Lua." *Monuments.*—An incised Celtic cross in the Romanesque archway, traditionally the tomb of King Murchad, 1118; Bishop Roan, 1694; Purdon, 1719; Redfield and Browne, 1719; P. M. D., II. (1894), p. 449. *Descriptions.*—Petrie, pp. 277–280; Bishop Mant; Brash, plate iv.; Dunraven, II., pp. 67–71; Dwyer, pp. 451–463; T. J. Westropp, R.S.A.I., 1892, p. 398; 1893, p. 194. Illustrations in all; plan of cathedral in last. There is a good illustration in Harris's "Ware"; O'Hanlon, VIII., p. 406.

122. **Same, ST. FLANNAN'S CATHEDRAL.** A cruciform structure, with a tower at the intersection, and dating about 1182. The east window has three lofty lights; the central has a semicircular head; the side lights and great splay arch are pointed. The latter has rich open work "fishbone," and diagonal ornaments. Its capitals, the corbels of the chancel, tower, arches, and east window of the south transept are boldly cut and interesting, Celtic interlacings and figures being combined with Gothic

foliage. In the south wall of the nave is a magnificent Romanesque arch, probably the west door of King Murchad O'Brien's church, *circa* 1080, as it closely resembles an arch put up at Caen by King Henry I., with whom Murchad corresponded.¹ The west door is pointed, and richly moulded, dating about 1220. Many carved fragments are embedded in the walls.

123. *Same*, ORATORY, 36 feet 6 inches by 25 feet 6 inches. A very perfect barrel-vaulted oratory with an over croft. Inserted west door, with bold plain mouldings and semicircular head. A chancel was added, but has been levelled. The popular name is Brian Boru's vault.



St. Molua's Oratory, Friar's Island, in 1791 (before destruction of the Nave).

124. *Same*, FRIAR'S ISLAND ORATORY, 10 feet 6 inches by 6 feet 6 inches. A small barrel-vaulted oratory with an over croft and east window slit with semicircular head. To this was added probably in the ninth century a nave 21 feet 6 inches by 12 feet 8 inches. It had a lintelled door with inclined jambs, and is illustrated by Grose, i., p. 88.
125. O'CONNELLOR (AGLISH SINCHILL), Sheet 37.—*Parish church.* Entirely demolished before 1839. *Founder* unknown. The name recalls the "Aglish da sinchell" near Cro Kevin at Glendalough. It is not named, 1302; Aglissonill, 1584.²

¹ Ussher's "Sylloge."

² MSS., F. 2-14, T.C.D.

126. **KILVILL** (AUGHINISH), Sheet 29.—*Ogonnellos Parish*. A graveyard.
127. **KILLURAN**, Sheet 36.—*Parish church*. 19 feet of the south wall stood in 1839. There was a window in it (not named in O. S. Letters); now entirely levelled. I found a late carved stone head in 1893. *Founder* unknown. "Kellidubiran," 1302; "Ciliubrain," 1390.¹
128. **KILSEILY**, Sheet 44.—*Parish church*, 47 feet 4 inches by 20 feet. A late church. Well dedicated to Seily. *Founder*, Seily; identity and date unknown. *Monuments*, Bridgeman, 1714, P. M. D., III. (1897), p. 399.
129. **KILLOKENNEDY**, Sheet 36.—*Parish church*, 56 by 24 feet. Gables had fallen before 1839. Now only fragments of the side walls remain. South door pointed, late fifteenth century. *Founder*, probably Cronan, to whom the well is dedicated; perhaps of Tomgraney, *ante*, 550. "Killogenedid," 1302. *Monuments*, O'Doogan, 1723–1733.
130. **CLONLEA**, Sheet 43.—*Parish church*, 42 feet by 18 feet 9 inches. The east window is of red gritstone, thickly ivied. South door is round-headed, fifteenth century, with a stoup in the right jamb, with two ogee-headed opes (Plate XII., fig. 13). *Founder* unknown. Legend in 1893 ran that the church was miraculously removed northward, across the lake, from St. Senan's well at Killaneena. Perhaps this preserves the fact of a change of site, and that the old church was dedicated to Senan, *c.* 550 "Clonileg" in 1302 (Mead of the calves).
131. **KILLANEENA**, Sheet 43.—*Clonlea Parish*. Traditional church site and well of St. Senan.
132. **INISHLOSKEY**, Sheet 54.—*O'Brien's Bridge Parish*. A defaced and heavily-ivied church on an island.
133. **TROUGH**, Sheet 53.—*O'Brien's Bridge Parish*. 10 feet of the west gable stood in 1839. Now entirely levelled; not named, 1302.
134. **KILCREDAUN**, Sheet 45.—*O'Brien's Bridge Parish*. Graveyard and well.
135. **KILTINANLEA**, Sheet 54.—*Parish church*, 59 feet by 18 feet 8 inches. A coarsely built, late fifteenth-century ruin. The east window is a tall ogee-headed slit; the south window is of yellow grit-

¹ Macnamara's Rental, Trans. R.I.A., vol. xv.

stone, with a neat trefoil head (Plate XII., fig. 12). South door is pointed and well moulded. It has a stoup (with two semi-circular opes) in the right jamb. There are a rock-cut bullaun and holy hawthorn to the north. *Founder*, Senan Liath, traditionally a brother of Mochulla; the well is, however, dedicated to the latter. Not named 1302. "Kilsenan," 1582¹; "Kiltanayn," 1584. It may be the church of "Cluoy-n-lard in Oblayd," whose rector, Malachy Maconmara, was removed for gross misconduct by Thady Maconmara, priest of Killokennedy, in 1462, under a letter of Pope Pius II.²

136. GARBAUN (TEAMPUL MOCHULLA), Sheet 63.—*Kiltinanlea Parish*. 28 feet of the south wall and 18 feet of the north remain; the south window is of the late fifteenth century, with a chamfered angular head cut out of one block (Plate XII., fig. 9). *Founder*, probably St. Mochulla of Tulla.

BARONY OF IBRICANE.

137. KILFARBOY, Sheet 31.—*Parish church*, 65 feet 9 inches [by 17 feet. The west gable had fallen in 1839. The ruin is of the late fifteenth century. The east and south windows have ogee heads, the former has got trefoils cut in its spandrels. The south door is well built (Plate XII., figs. 10, 11). It has a pointed arch, and a stoup with two round-headed opes in the right jamb (see illustration, Plate XII., fig. 10). *Founder*, St. Laughteen, "Kellinfearbreygy," 1302³; "Kilforbric" and "Kilfearbaigh," sixteenth century, said to have been founded A.D. 740; it was governed by Bishop Cormac, who died A.D. 837. *Monuments*, Fitzgerald, 1778; P.M.D., III. (1897), p. 396.
138. MOYMORE (INISDIA), Sheet 23.—*Kilfarboy Parish*, 40 feet by 19 feet 6 inches. The east window has two round heads (the shaft gone); south window and door. *Founder*, unknown.⁴ Patroness, Inghean Baoith. The place was called "Magh o mBreacain," 1599.

¹ Grant to E. Waterhouse.

² Theiner, "Monumenta," p. 433.

³ This disposes of the popular legend, "The church of the yellow men," i.e., Spaniards of the Armada, 1588.

⁴ For possible connexion with Luchtighern. See Ennistymon, p. 138, *supra*.

139. KILCORCORAN, Sheet 31.—*Kilfarboy Parish*. A graveyard, with a small oblong building, marked beside the main road, not far east from Miltown Malbay.
140. KILMURRY IBRICKAN, Sheet 38.—*Parish church*, 86 feet 6 inches by 24 feet 4 inches. A late plain church built of flags. The east end fell before 1839. The west gable has a broken bell chamber and window slit. The south wall has three plain slits and two pointed doors, one built up. A trefoil-headed light remains near the east end. *Founder*, unknown; not named, 1302; "cil Mhuire o mBracain," 1599.¹
141. INISCARRACH (MUTTON ISLAND), Sheet 38.—*Kilmurry Parish*. In 1887 I found the coarsely built west wall of a small oratory still standing in a cultivated field, and two roughly-shaped flag-pillars in a field to the north. *Founder*, St. Senan, *c.* A.D. 550; "Oilen Fitæ," 799; "Iniskereth," 1216; "Iniscaerach," *Life of Senan* (*c.* 1320).²
142. KILLARD, Sheet 46.—*Parish church*, 63 feet by 14 feet 4 inches. The gables and fragments of the adjoining walls remain. The east window had a semicircular head. The two south windows were respectively square and round-headed. The west gable had a plain bell chamber. *Founder*, unknown. "Kellarda," 1302.

BARONY OF CLONDERLAW.

143. KILCHRIST, Sheet 50.—*Parish church*, 77 feet 2 inches by 23 feet 3 inches. A late fifteenth-century building. The east window has two interlacing shafts and is pointed. The south door has a heavy angular weather ledge. It has a stoup with two pointed opes in the right jamb. There is a second smaller pointed door to the east of the last. There are two windows in the south wall, one heavily ivied, the more eastern has a round head.
144. INISMORE (DEER ISLAND), Sheet 50.—*Kilchrist Parish*. Church marked on map, "Inis mor," 977.³ Well Toberbreedia.
145. KILLADYSERT, Sheet 50.—*Parish church*, 75 feet by 21 feet. It differs considerable from the usual types in this county, and it is very regrettable that its origin is forgotten. It has a neat

¹ "Annals Four Masters."

² "Calendar State Papers, Ireland."

³ "Wars of the Gaedhil with the Gaill," p. 103.

belfry tower with stepped battlements at the west end, which was struck by lightning in 1826. It contains a residence for the priest, 8 feet 8 inches by 8 feet 5 inches, and opens into the church by a low pointed arch. The east window has inclined jambs, but is late Gothic, and had a shaft and transom now lost. The south wall has (beginning at the west end) a square slit; a pointed door (21 feet from the belfry); it has a heavy angular weather ledge; 15 feet eastward is a slit with an angular head 7 inches wide; 13 feet eastward is a narrow pointed door, 1 foot 5 inches wide; while a foot from the east wall is a window with square splay and semicircular-headed light. *Founder*, unknown. "Disert Murthill," 1302; "Disert Murthaile," c. 1284¹; "Desert Morehely," 1584; and "Killadysert murhull."²

146. INISDADRUM (CONEY ISLAND) Sheet 60.—*Killadysert Parish.*

There are two churches. Brash³ describes the older building as an oblong church, 16 feet 8 inches by 9 feet 10 inches. The masonry is of large blocks, and the west door has a lintel and inclined jambs. The east window is defaced. *Founder*, Brendan,⁴ A.D. 550. Imar, the Dane, and his sons were slain at Inis da Dromand, and Inis Mor, A.D. 977, by the Irish⁵; and "gold and silver, much wealth, and various goods," recovered in the islands and their fortresses.

147. *Sams.* A church not marked on map, but mentioned by Brash:

148. CANONS' ISLAND (AUGUSTINIAN ABBEY), Sheet 60.—*Killadysert Parish.*

The remains consist of a church, belfry, two side chapels and domicile round an arcaded cloister. A gate-house remains to the west. The east window has three plain lancets under a large splay arch; the quoins were removed to Killadysert chapel. The western door leading into the cloister has a stoup with two opes in the right jamb; the cloister had pointed skew arches at each angle. The arcade had plain piers and flag sills. The belfry is lofty and plain. The west doorway, porch, and window of the church, are of the fifteenth century. The window has two trefoil heads and a square hood. *Founder*, Donaldmore O'Brien, c. 1189.

¹ "Wars of Torlough."

² Dwyer, p. 499.

³ O'Hanlon, vol. v., p. 442.

⁴ P. 16.

⁵ "Wars of the Gaedhil with the Gaill," p. 103.

Monuments, a slab with a black-letter inscription to "Magister Cornelius." *Descriptions*, Frost, p. 71 (illustration); T. J. Westropp, R.S.A.I., 1897, p. 286 (plan and illustration).

149. INISLOE, Sheet 60.—*Killadyserf Parish*. Church levelled. *Founder*, St. Senan, *c.* 550; St. Moronoc, the penitentiary of Inialua, attended his death-bed.
150. KILLOFFIN, Sheet 68.—*Parish church*, 67 feet by 18 feet. A late building. The east window has two lights (the mullion gone); the south door and window are pointed. The west gable has a pointed bell chamber. *Founder*, Lugad, perhaps Molua. "Kellugifioun," 1302; "Killerfin," 1461.¹
151. KILKERIN, Sheet 68.—*Killoffin Parish*, 32 feet by 18 feet 6 inches. An early church; the north wall and ends of the nave remain. The chancel arch is 10 feet wide, built of flagstones. The west gable has partly fallen, and the chancel is levelled. *Founder*, St. "Keereen." Identity, uncertain.² A stone with a cross on it lies at his well and altar to the east of the church.
152. KILFEDDAN, Sheet 69.—*Parish church*, 67 feet 6 inches by 18 feet. A late building. The east has two pointed lights (shaft gone). The south door is pointed; the west gable has a round arched bell chamber. *Founder*, possibly Senan, to whom the well is dedicated. "Kelfidayn," 1302.
153. KILMIHIL, Sheet 48.—*Parish church*, 70 feet by 19 feet 6 inches. A late building; the east window is pointed with inclined jambs and a single light. The west gable has a small bell chamber and a doorway. The south door is pointed; there were three south windows lintelled, two defaced and three round headed. *Founder*, Traditionally built by Senan, and dedicated to St. Michael.³
154. KILTUMPER, Sheet 48.—*Kilmihil Parish*. A very doubtful site. Two "Termon stones" remain at Termon roe; also a well, "Tober righ an domhnaigh" and a cromlech called "Tumper's grave" at Kiltumper.

¹ Charter of Clare Abbey, 1461.

² Perhaps Kieran, of Clonmacnoise, who, after leaving Aran in 538, entered the Abbey at Scattery.

³ "Ord. Survey Letters," R.I.A.: see also Bruodinus's "Propugnaculum" for miracles at its well in 1632.

155. **KILMURRY MACMAHON**, Sheet 58.—*Parish church*. Entirely destroyed in 1819 to build the modern Protestant church. It had in 1640 a fine monument of the Mac Mahon, 1460.¹
156. **KNOCK**, Sheet 58.—*Kilmurry Parish*. Entirely levelled, it stood in Kilmore demesne. It was a parish church "Cnoc" in 1302.
157. **KILLIMER**, Sheet 67.—*Parish church*, 50 feet 6 inches by 17 feet. The east window was ancient, round-headed, and well cut in gritstone, the sides inclined. The west gable has a broken bell-chamber. The south door is pointed, near it is a rude door now closed. *Founder*, St. Emeria, locally "Iomaigh," traditionally a contemporary of St. Senan. Her "leac" and well lie to the east. "Killadmyr" in 1302.

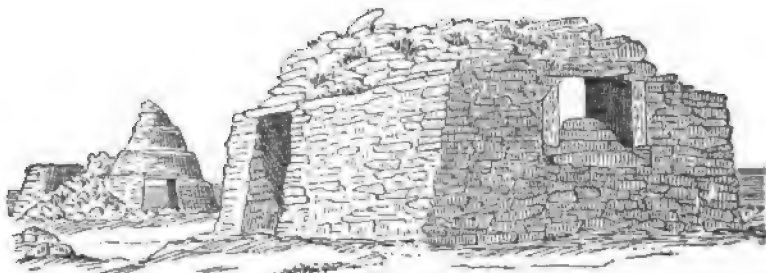
BARONY OF MOYARTA.

158. **KILFEARAGH**, Sheet 56.—The gable of a late eighteenth century church alone remains. *Founder*, Fiachra. "Killifeheragh" (Kelliheneragh), 1302. Perhaps, "Cil Fiabra," near Kilkee, in O'Brien's Rental, 1390. It was rebuilt early in the last century by the Macdonnells of Kilkee.²
159. **BISHOP'S ISLAND** ("ILLAUN AN ESPIG GORTAIG"), Sheet 56.—*Kilfearagh Parish*. Two very ancient dry stone buildings and two plain pillars stand on an inaccessible sea rock, 215 feet high, and are clearly visible at no great distance from the opposite cliff. The oratory is about 18 by 12 feet; the walls, 2 feet 7 inches thick, with a lintelled east window and south door. West from it lies a circular clochan, 115 feet in circumference, with a domed roof built in stages externally, and a lintelled door to the east. *Description*, W. Wakeman, in "Archæologia Hibernica," p. 58. Waring, Plate vi., fig. 9.
160. **KILKEE**, Sheet 56.—*Kilfearagh Parish*. Is said to derive its name from a lost church of St. Caeide, near his well. The place is "Cil Caeidi," in O'Brien's rental, 1390.
161. **KILNAMANORHA**, Sheet 56.—*Kilfearagh Parish*, near Poulnishery Bay.

¹ Bruodinus, "Propugnaculum," book v., chap. xvii.

² Mason, p. 431.

162. **KILDIMO**, Sheet 56.—*Kilfearagh Parish*. A demolished church, levelled before 1816¹; site in Emlagh, north from the last. *Founder*, Dioma. The church was standing in 1652. A skirmish took place between the O'Cahans and the Cromwellian commander, Captain Scarff: the latter was killed, and his head was cut off, and fixed on the gable of the church.² The place is called Killimer, on the Down Survey Map, 1655.
163. **KILNEGALLIAGH**, Sheet 56.—*Kilfearagh Parish*. Entirely levelled before 1839. *Founder*, Senan, c. A.D. 550—"Kilnacallige, very dear to Senan," in his "Life"; also named "Kileochaille" in same work.



Oratory and Cell on Bishop's Island.

(From Dr. Frazer's Collection.)

164. **MOYARTA**, Sheet 65.—*Parish church*. Some fragments remained in 1816;³ entirely levelled before 1839; not named in 1302 list. *Monuments*, O'Cahan, O'Honeen, and Conti.
165. **KILCRONY**, Sheet 65.—*Moyarta Parish*, 17 feet 4 inches by 12 feet. A late plain little oratory, built of flagstones; the east window has a semicircular arch. The west door has a flag lintel, and flat relieving arch. The heads of the two south lights are gone. *Founder* not known. "Cil Croine," in O'Brien's rental, 1390. *Monuments*, Morony, of Doonaha, &c. *Description*, Mason, II., p. 435.
166. **KILCASHEEN**, Sheet 56.—*Moyarta Parish*. Here the grandfather of Eugene O'Curry, buried the bodies of those who died in the pestilence of 1739, bringing the bodies thither on "sledges."

¹ Mason, II., p. 434.

² Mason "Parochial Survey." II., p. 434.

³ *Ibid.*, p. 431.

167. **TEMPLEMEESH**, Sheet 66.—*Moyarta Parish.* Entirely levelled before 1839.
168. **KILCREDAUN**, Sheet 72.—*Moyarta Parish.* An ancient oratory, 23 feet 7 inches by 15 feet 6 inches. It evidently dates from the eleventh or early twelfth century. The east window has a neatly-built splay with a semicircular arch; the outer face of the light was moulded, and above the head was scroll work (Plate XI., fig. 6) similar to a base in the church of St. Saviour, Glendalough. The south window has a flat head, and the west door is defaced, but had a semicircular arch. *Founder*, Caritan, a friend of St. Senan, c. A.D. 550. It is called "Kilcharitain," in the "Life of Senan." Popular name in 1839, Teampul Sheorlais, from the burial place of Charles MacDonnell in the ruin, 1773.¹ (See Plates IX. and XI., fig. 6.)
169. *Same*, **TEMPLE AN AIRD**, Sheet 72.—*Moyarta Parish*, 23 feet 2 inches by 11 feet 6 inches. A coarsely-built late oratory, on the hill behind the last. The east and south windows are flat-headed; the south door pointed. The west end had a bell chamber. Below it to the south, on the shore, is the holy well of St. Caritan.
170. **KILBALLYOWEN**, Sheet 65.—*Parish church*, 76 feet 6 inches by 21 feet. A long plain building of flagstones; the windows are all small and flat-headed; the south door is pointed; the west gable has a bell chamber. The walls are of thin flagstones, and have a corbelled cornice. There was, in 1816, a font carved with branches,² I could not find it on either of my visits; and the foundations of a "Friary," or priest's house, lie to the north of the road. *Founder* unknown, "Killmolihegyn, 1302. *Description*, Dwyer, p. 504.
171. **TEMPLE NA NAEVE** (Ross), Sheet 64.—*Kilballyone Parish.* A small church, 34 feet 6 inches by 15 feet 6 inches, is of large old-looking masonry. All the features are much injured. The south door was pointed, but has been defaced since 1839. There are round stones on the altar. A corbel with a carved head lies loose in the ruin, and the east gable is down. In 1839, it was called "Tempul an naomhar naomh," and reputed

¹ Mason, II., p. 435.

² *Ibid.*, p. 432.

to be the church of nine saints. *Founder*, St. Senan, *c.* A.D. 500, who founded a church at Ross an airchail in Corcovaskin.¹ It has been identified with Ross Benchoir, "on the western ocean," the cell of St. Kieran's nurse, Cocha²; but this place seems to have been "on the eastern ocean."³

172. **KILCOAN (CROSS)**, not marked on the Ordnance Survey, *Kilbally-one Parish*. The church was demolished before 1816,⁴ a graveyard remains south of the last. *Founder*, Coan, the last survivor of the "nine saints" of Ross.
173. **KILMACDUAN**, Sheet 47.—*Parish church*. The east gable and portions of the sides remain; it was built of flagstones on a rising ground near a stream. The east window is well moulded, and has an ogee head. It dates from the later fifteenth century. The south window is very early; it is made of sandstone, and recessed with inclined jambs; the older head has been replaced by a plain semicircular head of flagstone. The walls have a neat cornice with wedge-shaped corbels. Round the church remains a "village" of over thirty vaults. *Founder*, St. Senan, *c.* A.D. 550;⁵ at "Cil mhic an dubhain,"⁶ "Kilmadayn," 1302. "Cil mhic dubhain," 1591.⁷
174. **KILRUSH**, Sheet 67.—*Parish church*. A very ancient church consisting of a nave, 44 feet by 19 feet, and a choir about 18 feet 6 inches square. The west door has a lintel and inclined jambs; the sides and the piers of the chancel arch are early, but the arch itself is pointed like the south door. *Founder*, possibly Senan. Accobran and Meallan, of Cilrois, in Corcovaskin, are also named.⁸ "Kellroys," 1302. "Cilrois," in O'Brien's Rental, 1390.⁹
175. **KILCARROL**, Sheet 67.—*Kilrush Parish*. This church was standing in 1816. It contained "a worm-eaten image" of St. Carrol.⁹
- 176 to 178. **MOYLUGH**, Sheet 67.—*Kilrush Parish*. An early foundation of St. Senan, *c.* A.D. 520, and his birthplace, "Maghlaca."¹⁰ *Description* (Illustration) O'Hanlon, I., p. 470; Mason, p. 433. It had three churches.

¹ "Vita S. Senani."

² Archdall's "Monasticon."

³ "Silva Gadelica," II., p. 11.

⁴ Mason, vol. II., p. 437.

⁵ "Vita S. Senani."

⁶ "Ann. Four Masters."

⁷ Calendar of Oenghus, January 28th.

⁸ Mason, p. 430.

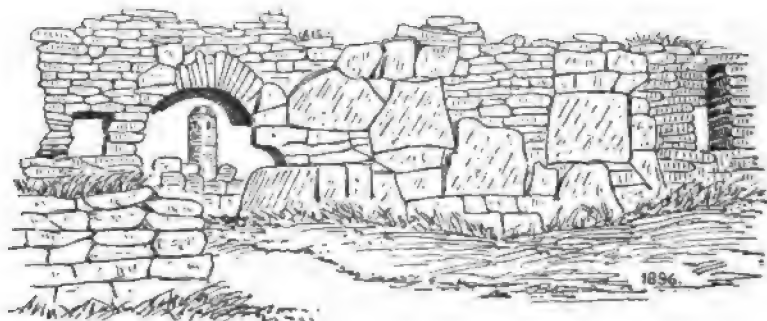
⁹ Mason, p. 433. Kilcarrol appears in a mortgage, 1611.—Trans. R.I.A., xv.

¹⁰ "Vita S. Senani," Colgan, Mason VIII.

176. *Same*, TEMPLE SENAN. An oratory built of flagstones, 32 feet 3 inches by 13 feet. The north and south walls have fallen, except a fragment of the last. The gables remain; they were rebuilt from 6 feet above the present level of the ground. The east window is lintelled; there is a small lintelled window in the west gable which was crowned by a socket and cross which had fallen before 1839.
177. *Same*, SEIPEAL BEG SHEENAN. An oratory, 11 feet 7 inches by 9 feet 8 inches, stands near the last; the east window is lintelled; the sills of the south door and window remain.
178. *Same*, NAMELESS ORATORY, 30 feet 3 inches by 16 feet 6 inches. It is levelled to its foundations, and lies at the west end of Temple Senan.
- 179 to 185. INISCATHA OR SCATTERY ISLAND, Sheet 67.—*Kilrush Parish.* The island lies opposite Kilrush, and possesses six churches, and a fine archaic looking round tower, over 100 feet high, and 52 feet 4 inches in circumference. The corbelled door is on the ground level. *Founder*, St. Senan, son of Gerrchin, of Moylough (a man of good family in Corcovaskin), about A.D. 520. It suffered much from the ravages of the Danes and English. It was a bishopric till 1188. "Inis Cathaig," A.D. 861.¹ *Descriptions*—There is a large amount of printed material relating to this Island. We need only note—Dyneley (1680); R.S.A.I., 1866; Lady Chatterton's "Rambles"; Dutton, p. 304; Dwyer, p. 499; Keane, p. 377; Frost, p. 80; Miss Stokes (Plate 20); Malone, R.S.A.I., 1874; T. J. Westropp, R.S.A.I., 1897, p. 276 (who collects the earlier notices). Illustrations are given by Miss Stokes, J. Frost, and T. J. Westropp. Vested as a National Monument.
179. *Same*, THE CATHEDRAL.—68 feet 4 inches by 27 feet 6 inches. The lower parts of the walls are early, with large masonry; the upper parts are of flagstones. The west gable has antæ and a door with lintel and inclined jambs. The south windows have been replaced, probably in the fifteenth century, by trefoil-headed slits. The east end is of the same period, and has a fine pointed window, which had two trefoil-headed lights, with a quatrefoil above them, but the shaft has fallen. A mitred head is carved on the keystone. A sacristy adjoins the building at the north-east corner, and there are two pointed doors near the west end.

¹ "Ann. Four Masters"

180. *Same, ORATORY.*—It consists of a nave and chancel, 23 feet 6 inches by 12 feet 10 inches, and 8 feet 9 inches by 10 feet 6 inches. The chancel had been levelled to the ground before my first visit in 1878, but was partly rebuilt by the Board of Public Works. They excavated the site, and disclosed the base of a rich Romanesque chancel arch, dating about 1100, with clustered pillars and chevrons (Plate XI., fig. 11). The west gable seems much older.
181. *TEMPLE SHENAN.*—It consists of a nave and chancel 23 feet 10 inches by 16 feet 9 inches, and 10 feet 10 inches by 10 feet 9 inches. The east gable leans outward. There was a chancel arch, with clustered pillars, now fallen. The south door is pointed, and the ruin bears little mark of any great antiquity.
182. *LATE ORATORY.*—21 feet 8 inches by 11 feet 2 inches. It stands close to the west gable of the last, and is plainly built of flag-stones; the walls are only 5 to 6 feet high. At the west end is a scored stone, supposed to have been an ogam inscription, and a beautiful Celtic cross-slab, with Irish inscriptions:—"Op do moenach aite mognoin," and "Op do moinach."
183. *TEMPLE AIRD NA NAINGEL.*—40 feet 6 inches by 16 feet 8 inches. A very early church; the foundations and the south wall alone



Temple aird na nAingel, Scattery.

remain; the wall is of fine masonry, of unusual size; the south window is defaced, and a rude south door has been inserted. It is mentioned in "*Vita S. Senani.*"

184. **KILNAMARBEE.**—67 feet 10 inches by 18 feet 6 inches. A late mediæval church, probably of the fifteenth century. The east window has a moulded double light (the shaft lost). There was a lateral aisle to the north, with plain, pointed arches; the west end has great stepped buttresses. The present burial ground of Scattery adjoins it, and gives its name to the ruin.
185. **ALLEGED SITE.**—A graveyard undercut by the sea lies south-west from the last, and is said to have been the site of the seventh church. The slab on which St. Cannara sailed to Scattery was shown on the shore near the fort. There was also a cairn called “Glun Senain,” where the saint used to kneel.
186. **SHANKILL, Sheet 67.**—*Kilrush Parish.* Has the foundations of a church.

In closing this survey I may add that I have had to depend entirely on others in the cases of Killard, Killimer, Kilrush, Kilmihil, Kilfeddain, Killoffin, and Kilkieran (all being along the Shannon). Some of these I have seen, but could not sketch and examine. Similarly Clonrush, Kiltoraght, Kilconry, and Moy lay beyond my reach; so if I have erred in their description, I have no means of correction. It is, I fear, too probable that in a work extending over 24 years, as time and opportunity occurred, error, misunderstanding, and forgetfulness may have led to other and less excusable mistakes. I hope these may be detected and forgiven, and that the Survey may help to the complete study of the numerous churches of Thomond beyond the Shannon.

APPENDIX.

The following graveyards are given as being possibly ancient church sites, though I know of no tradition or remnant of a building connected with them. There can be little doubt but that many of the older churches perished before the Norman invasion, though their sites continued to be used for burial.

BURREN.

- 187. KILLAMURROGH, Sheet 1.—*Gleninagh Parish.*
- 188. KILLOGHIL, Sheet 2.—*Dromcreehy Parish.*
- 189. AUGHINISH, Sheet 3.—*Abbey Parish.* I could procure no information as to the existence of this church.
- 190. KILWHEELRAN (GLENNAMANAGH), Sheet 5.—*Oughtmama Parish.*

CORCOMBOE.

- 191. KILCORNAN, Sheet 15.—*Kilmanaheen Parish.*
- 192. GORTNAKILLA (TEERLEHEEN), Sheet 24.—*Clooney Parish.*

INCHQUIN.

- 193. TEMPLEBANNAGH, Sheet 11.—*Kilkeedy Parish.*
- 194. KILMASCUTT, Sheet 17.—*Ruan Parish.*
- 195. KILRANAGHAN, Sheet 17.—*Same.*
- 196. KILKEE, Sheet 25.—*Same.* Has a well.
- 197. KNOCKAKILLA (BALLYEA), Sheet 24.—*Inagh Parish.*
- 198. KNOCKAKILL (FORMOYLE), Sheet 32.—*Same.*

ISLANDS.

- 199. KILCOLUMB (KNOCKMORE), Sheet 32.—*Kilmaley Parish.*
- 200. KILLANURE, Sheet 33.—*Dromcliff Parish.*
- 201. KILLERK, Sheet 41.—*Killone Parish.* Perhaps the "Killar-genayn" of 1302.
- 202. KILLEA (CRASBRIEN), Sheet 41.—*Clondagad Parish.*
- 203. KILFIDDAUN, Sheet 47.—*Same.* Has a well, Toberaniddaun.

BUNRATTY.

- 204. KILVILLY, Sheet 26.—*Inchicronan Parish*. Has a well, Toberbreedia.
- 205. KILLAVEINY (CRUSHEEN), Sheet 18.—*Inchicronan Parish*.
- 206. KILFIDDANE, in *Templemaley Parish*, according to Mr. Frost, has a font and church site.¹
- 207. KILLIAN, Sheet 26.—*Same*. Doughnambraher.
- 208. KILBAY, Sheet 26.—*Clooney Parish*.
- 209. KILCATHERINE, Sheet 26.—*Same*.
- 210. KILLOGHAN (CAHERLOGHAN), Sheet 34.—*Same*.
- 211. KILLULLA, Sheet 51.—*Clonloghan Parish*.
- 212. SAINT'S ISLAND (CLONMONEY), Sheet 51.—*Bunratty Parish*.
- 213. KILLAVOGHER (KNOCKALISHEEN), Sheet 63.—*St. Patrick's Parish*.
- 214. MONKENAGLIGGIN, Sheet 63.—*Killeely*.

TULLA.

- 215. KILTANON, Sheet 27.—*Tulla Parish*. There are, beside the graveyard, a fort, Lisnagleera, a cromlech, and a well, Toberbreedia.
- 216. CRAGG, Sheet 35.—*Same*. Kilchulla graveyard and Tobermochulla well.
- 217. FORTANNE, Sheet 35.—*Same*. Has a well, Tobermochulla.
- 217A. FOMERLA, Sheet 34.—*Same*. A bullaun lies in this graveyard.
- 218. KYLEATANVALLY (FOSSABEG), Sheet 28.—*Tomgraney Parish*.
- 219. KYLEVORIA (CAPPACANAUN), Sheet 20.—*Same*.
- 220. KILNABARNAN (BALLYLAGHNAN), Sheet 37.—*Ogonnelloe Parish*.
- 221. KILMOCHULLA, Sheet 53.—*Kilsilly Parish*.
- 222. KILGOREY, Sheet 28.—*Kilnoe Parish*. Graveyard and well of St. Mochulla.
- 223. KILMORE, Sheet 53.—*Killokennedy Parish*. Has two wells, Toberanore and Toberamanrielta.

IBRICKAN.

- 224. KILDREMA, Sheet 36.—*Kilfarboy Parish*.

¹ "History," p. 47.

IBRICAN.

225. **TEMPLE NA SPANNIGG** is mentioned by Mason¹ as near Spanish Point. It was used as a burial-place for the Spaniards wrecked in 1588. If it be a site which I visited in 1887 only mounds remain.
226. **KILTINNAUN (TULLAHER)**, Sheet 56.—*Killard Parish*.
227. **KILBREEDIA**, Sheet 38.—*Kilmurphy Parish*. Has a well, Toberbreedia.

CLONDERLAW.

228. **KILLANNA (MOUNT SHANNON)**, Sheet 68.—*Killofin Parish*.

MOYARTA.

229. **KILLINNY**, Sheet 65.—*Moyarta Parish*.
230. **KILLAKNICK (DRIMELIHY WESTROFF)**, Sheet 47.—*Kilmacduane Parish*.
231. **KILTRELLIG**, Sheet 71.—*Kilballyons Parish*. Has a well.
232. **KILCLOGHER**, Sheet 72.—*Same*. Has a well, Tobersean.
233. **KILKEEVAN (BEEAGHYA)**, Sheet 57.—*Kilrush Parish*.

The only Clare Churches which I have noted in the records whose sites are not known at present are—

234. **KILCONNELL**, 902, on the Fergus (named in the will of Cormac, King of Cashel).
235. **WAFERIG** (if not Oughtdarra), 1302.
236. **DISERT**, 1302, near Killonaghan.
237. **KILLENYARNY** (not Killeany), 1302, near last.
238. **KELLARGENAYN** (if not Killerk), 1302, between Kilmaley and Clare.
239. **ERIBANUS** (or Sribanus), 1302, near Clondagad.
240. **COLLEBONOU**, 1302, near Killard. Perhaps the church renamed "Kilmurphy Ibricane."
241. **MUKAN**, 1302, near Kilraghtis, or Kilbreacan.
242. **KILLITIRE**, 1317, near Letterconan, in the Burren ("Wars of Turlough").
243. **KILVOORY**, 1584, near Killeedy, in Tulla Barony (MSS. E 2. 14 T.C.D.).

¹ "Parochial Survey," vol. i., p. 491.

244. KYLCORIDAN, 1584, near Kilmurry MacMahon (*Ibid.*)
245. KILJORASH, 1584, near last (*Ibid.*)
246. TEMPLE CRIGH, 1584, near Carran (*Ibid.*)
247. KILOURG LONAYN, 1584, in Corcomroe. Probably Killaspuglonane (*Ibid.*)
248. KILLASPULE, 1584 (if not Killaspuglonane) (*Ibid.*)
249. TEMPLEGLAN, 1584, near Nuoghaval (*Ibid.*)
250. KILVILLY, 1584, near Dysert O'Dea (*Ibid.*)
251. KILNOE, 1584, near Kilkeedy (perhaps Temple na deirka, or Correen) (*Ibid.*)
252. KILVALE, 1584, near Kilmurry Ibricane (*Ibid.*)
253. KILLONE, 1586, near Tullyglass. (Inquisition *post mortem* of Macnamara Ffynn).
254. FEENISH ISLAND had a church ("Vita S. Senani"). No trace or tradition remains. Ancient name Fidh Inis.
255. INISTUBRID is also named in the same authority as having a church, which has completely vanished.
256. CRATLOE has the alleged site of an unrecorded "friary."

Photographs of the following ecclesiastical antiquities in the county Clare appear in the collection of the Royal Society of Antiquaries of Ireland, which deserves to be more frequently consulted by antiquaries than has been the case to the present time. (Thirty-eight of these photographs were exhibited when this Paper was read.)

Churches: Canons Island, Carran, Clare, Coad, Corcomroe, Dromcliff, Dromcreehy, Dysert O'Dea, Ennis, Gleninagh, Inchicronan, Iniscaltra (3), Kilballyowen, Kilcorney, Kilcredaun, Kilcrony, Kilfenora, Kilkeedy, Killaloe (2), Killeany, Killilagh, Killoe, Killonaghan, Killone, Kilmacreehy, Kilmaley, Kilmurry-Ibricane, Kilnaboy, Kilraghtis, Kilshanny, Noughaval, Oughtmama (3), Quin (2), Rathblamaic, Rathborney, Scattery (5), Temple an aird, Templemore, Termon, Tomfinlough, Tomgraney, Toomullin, Tulla (53 buildings).¹

Round Towers: Dromcliff, Dysert O'Dea, Iniscaltra, Kilnaboy, and Scattery.

Crosses: Dysert O'Dea, Kilfenora (3), Kilnaboy, Kilvoydan, Noughaval, Skeagh a Vanoo.

¹ The following have since been added:—Bunratty, Feenagh, and Kilfinaghta or Ballyaheen (56 in all).

HOLY WELLS¹.

As an addition to the well-lore of Ireland, I may be permitted to add a list of those which have not been already noted in the previous pages in connexion with the patrons or the church sites. Some have supposed the following to be pre-Christian :—Tobereevul, the well of Aoibhill, the great banshee of the Dalcassians, on Craglea, above Killaloe. Tobereendowney (so Mr. R. A. S. Macalister),² at Kiltumper, and on border of county Galway. Tobersheela (so Mr. M. Keane)³ and Tobergrania (cromlech used as a well), in Ballycroum.⁴

Tobercruhnorindowan at Killard is dedicated to the Creator of the world.

Only one well, Toberisa, near Bunratty, is named after our Saviour, and, besides her three churches, three wells, Tobermurry, are dedicated to the Virgin, in Drimelihy Westby, Kilmacduane, and Killadysert. *St. John* has wells at Killone and Tromra. *St. Patrick* at Rossalia, Correen, and Clooney (Bunratty). *St. Martin* is patron of the wells at Moyarta, Ballynecally, and Lemaneagh. *St. Michael* at Kilbreacan, Cappa (Bunratty), and the Kilmihils. *St. Augustine* at Garrynaghry and Kilshanny. The *Holy Cross* at Gleninagh. An *Angel* at Kilcorney.

The other wells we may group under their parishes :—*Kilsenora*, Toberdane. *Clooney* (Corcomroe), Tobermooghna. *Kilkeedy*, Toberenatemple, near Templenadeirka, and Tobercollure. *Dromcliff*, Tobernalettan and Toberateaskan. *Quin*, Toberlannive, Tobernachtin, Tobercrine, Toberaneeve, Toberkeeghaun, and Toberandillure. *Doora* Toberdooran. *Templemaley*, Tobernacoolia. *Clooney* (Bunratty), Tobernalaghan, Tobercreile, Toberavannan. *Bunratty*, Tobernamarkauv. *Kilmurry na gall*, Toberfailia. *Kilfinaghta*, Tobernavogue. *Tulla*, Tobermacshane in Uggoon, Toberbugvile, Toberknockall, and Toberslattery. *Moynoe*, Tobernagat. *Ogonnellas*, Tobersraheen. *O'Brien's Bridge*, Tobernasool. *Kilfarboy*, Tobermurrish. *Kilmurry Ibrikan*, Tobernahallia and Tobervan. *Kilballyowen*, Toberooan. *Kilrush*, Toberaneddan. *Kilmurry mac Mahon*, Toberyrowarta. *Kilfearagh*, Tobermanorha. *Killadysert*, Tobernamonastragh (Canon's Island).

¹ The "holy" reputation of many of these is very slight.

² *Trans. R.I.A.*, vol. xxxii., Part vii.

³ "Towers and Temples," p. 362.

⁴ See above, p. 85.

DESCRIPTION OF ILLUSTRATIONS.

PLATE VIII. *Templemore and Noughaval Churches.*¹

PLATE IX. *Killeany and Kilcredaun Churches.*

PLATE X. *Dromeliff and Quin Churches.*

PLATE XI. *Pre-Norman Churches.*—Fig. 1. North window, Templemaley. 2. East window, Clonloghan. 3. South window, Clonloghan. 4. East window, Termon Cronan. 5. South window, Kilfinaghta. 6. East window, Kilcredaun. 7. South window, Noughaval. 8. West door, Termon Cronan. 9. Ambreys, Kilfinaghta. 10. West door, Tomfinlough Oratory. 11. Base of chancel arch, Oratory, Scattery. 12. East window, Killeany. (This is of the type of those at Doorra, Dromcreehy, Kilcredaun, &c.)

PLATE XII. *Gothic Churches.*—Fig. 1. East window as rebuilt, Kilkeedy. 2. South window, Tomfinlough. 3. East window, Kilmacreehy. 4. East window, Coad. 5 and 6. Fragments built into wall, Clooney (Bunratty). 7. East window, Rathborne. 8. South door, Bunratty. 9. South window, Temple Mochulla. 10. Stoup, Kilfarboy. 11. South door, Kilfarboy. 12. South window, Kiltinanlea. 13. Stoup, Clonlea.

PLATE XIII. *Tomgraney Church.*—Fig. 1. Eastern window of south chancel wall. 2. Western window of same. 3. Northern window of chancel, and details of same. 4. Window-head built into south wall. 5. Capital, removed from Rectory. 6. Capital of shaft, south-east angle. 7. Ditto, north-east angle.

¹ The photograph of Noughaval is by Dr. George U. Macnamara.

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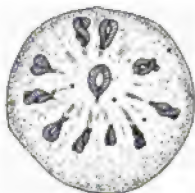
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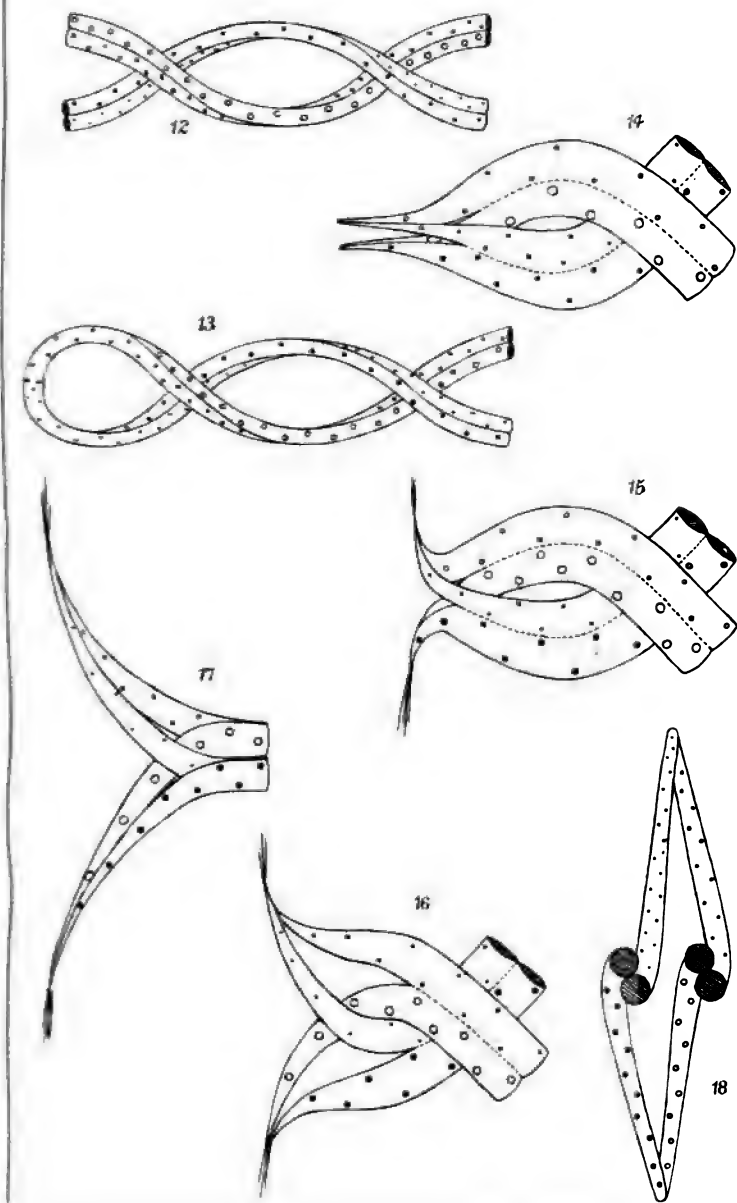


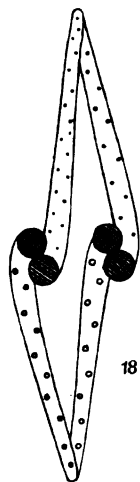
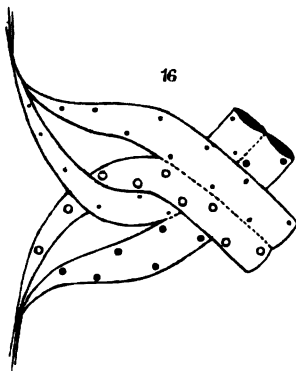
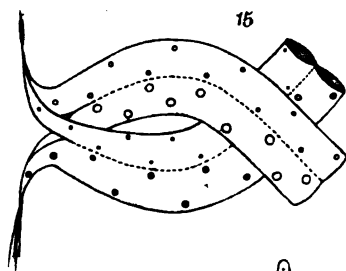
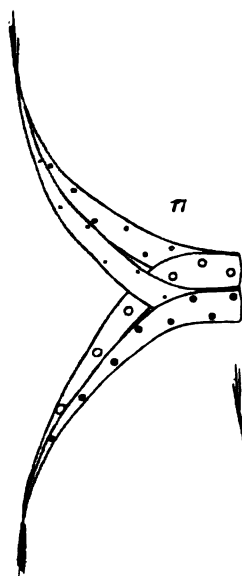
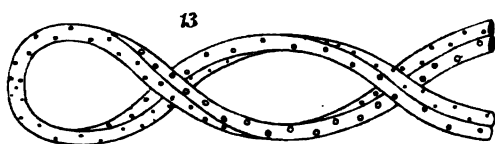
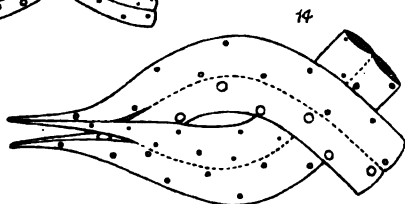
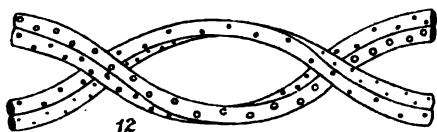
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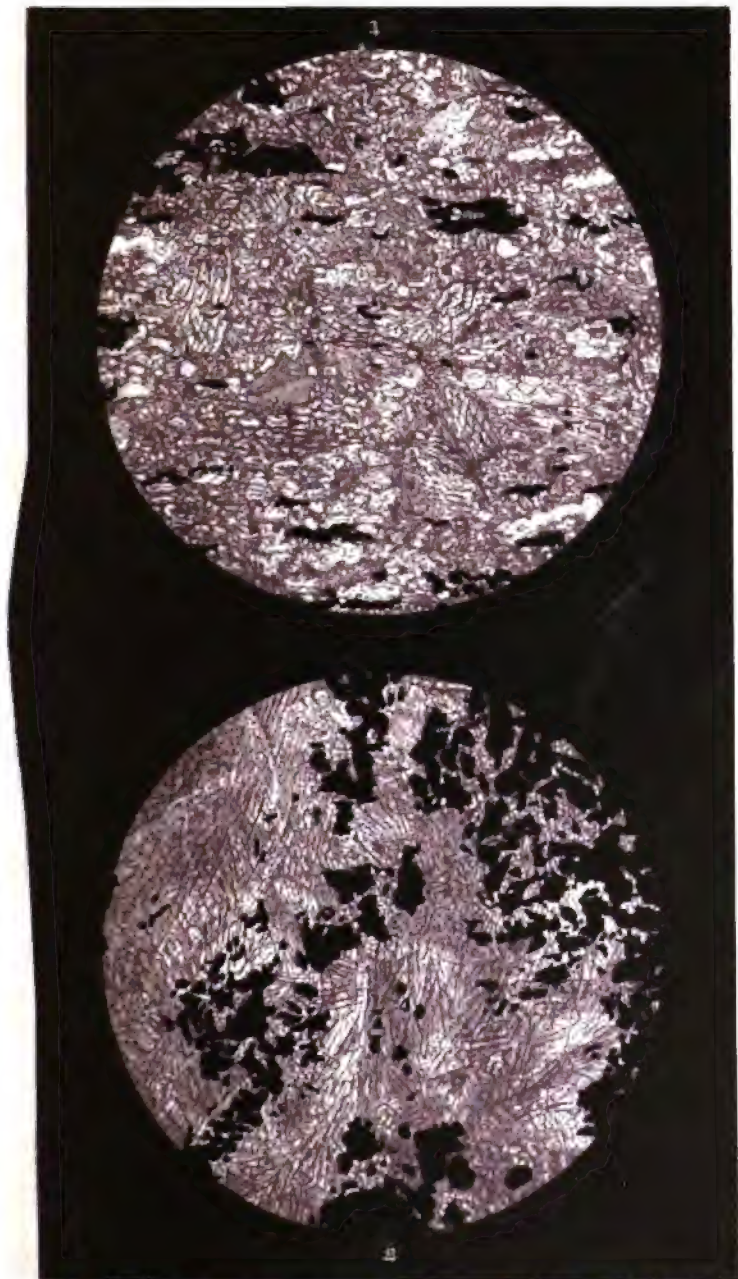


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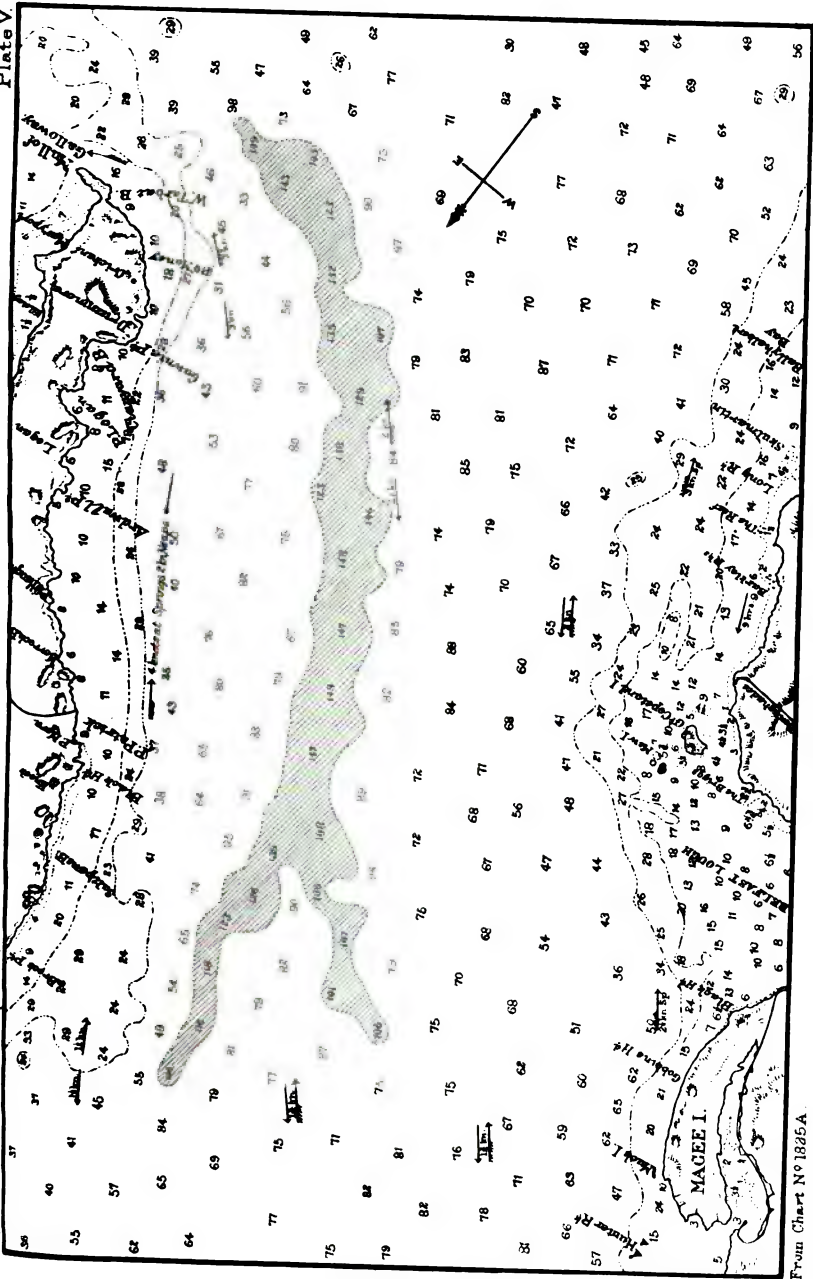










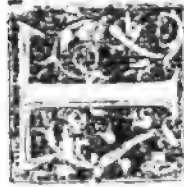


(33)

ACCOUNT Of the chief OCCURRENCES OF 1781.

Together with some Particulars from
ENGLAND.

From Monday the 12 of March, to Monday the 19 of March.



His wreck, after that by the happy Revolves of the Convention ready to be published, the godly part of the Nation have received in mortification was defiled, many infamous pledges, that whatsoever they define, shall be accomplished; men now begin to look after what will be feared by the Court-martee for Church and University affairs; this is the thing I now count by all eyes in a cheerful expectation of his progress; the people crying, Why tarry the wheels of Reformation? Shall we never see Religion where it was? Lay aside your long delay'd intention of erecting a new College, a new School is more necessary, where the young Church at *Dedham* may be trained up in the good old Lessons of Truth and social Discipline. Thus the people generally. What will be determined by the Committee, leave patience, a little time will disco-

E
ver th.

42

(42)

Sunday, March 17.

This day the House debated the matter of Grievances reported unto them by Master Temple, as also the Instructions to be given unto the Commissioners to be sent into England, reported by Sir Paul Davis: both which Debates were then adjourned untill Monday next.

From England.

It is signified by letters from *Lombard* to private hands dated the 13th instant, that all things there are in a good condition. At the same time these came also an Authority to the Lord *Bright*, Sir *Charles*, Sir *John Clarendon*, and Sir *William Bury*, to act as Commissioners for the management of the Affairs of *Ireland*. The Seal is expected by Sir *John Temple* very suddenly, with Commissions for the several Judges. The Proceedings in *Ireland* are well approved of, and the General Convention likely to sit; it being supposed that the Authority in *England* will not deny *Ireland* its former privileges of Parliament and taxing themselves; but as an additional favor will allow them 8000*l.* a Month, for the better supply of their Army, and the ease of the Country. They are very buile in *England* about settling the Militia in the several Counties.

Divers Petitions have been preferred, That this Parliament should rather continue to settle the Nation, than a new one be called; to which the most sober people seem to incline, and tis said that Gen. Monk is convinced that it is best it should be so: but whether they will continue sitting or dissolutive, by the next you will be more fully satisfied, but the first is thought to be most likely; and that the House of Lords will be also reformed, that Vote being repeated which was made formerly to discontinue them: and several of the Members now sitting have declared that they will not continue to sit without them. There hath been lately a Meeting at *Whitehall* by Gen. Monk, and ten of the most eminent persons in Authority in the Nation, and ten of the principal Officers of the Army touching matters of high importance; but the result thereof is not yet known.

Dublin, Printed by *Will. Bladen*, 1659.

(25)

Numb. 41

Mercurius Hibernicus,

OR THE

Irish Intelligencer:

Communicating all

Transactions both Domestick and Foreign.

With an exact Account of every dayes proceedings
in the Court of Claims.

Published with Licence, according to Order.

From Tuesday February 3, to Tuesday February 10, 1662.

By the Lord Lieutenant and Council

ORMONDE.

WHereas in an Act lately passed in this present Parliament, Intituled, *An Act for selling the Subsidy of Poundage and granting a Subsidy of Tunnage, and other* ^D*sums*

(64)

London March 2. 1662.

The French Ambassador Monsieur de Camille who is here in London, having demanded the same Priviledges which formerly have been allowed to Ambassadors at their Reception, viz. The being accompanied by the Coaches of other Publick Ministers residing here: and the King of England having forbid that Customs by an Order of his Council, wherein the said Ambassador doth not acquiesce: His Majesty hath sent Mr. Tressart to Paris, to requite the King of France with the said Order, and to desire an Injunction to his Ambassador to conform therunto: for the avoiding of such Disorder as not long since fell out between the French and Spanish Ambassador upon the like occasion.

We are certainly Informed that the two East India Ships called the Concord and the Truro, are now safely come into Plymouth Road to the great Joy of the Merchants, who had already given Seventy in the Hundred Assurance-money. Their Cargoes is Callicornes, Pepper, Saltpeeter, Cinamon, the value of between 60000 and 70000 pounds.

Dublin, March 9.

You can have no Information concerning the Plot, or upon what score the persons now in Hold were secured, it being not thought fit by the Council as yet to divulge any thing concerning it.

Dublin, Printed for Samuel Dancer Bookseller at the Signe of the Horse-Shoote in Castle-street. 1662.



TEMPLEMORE, KELLS, COUNTY CLARE.



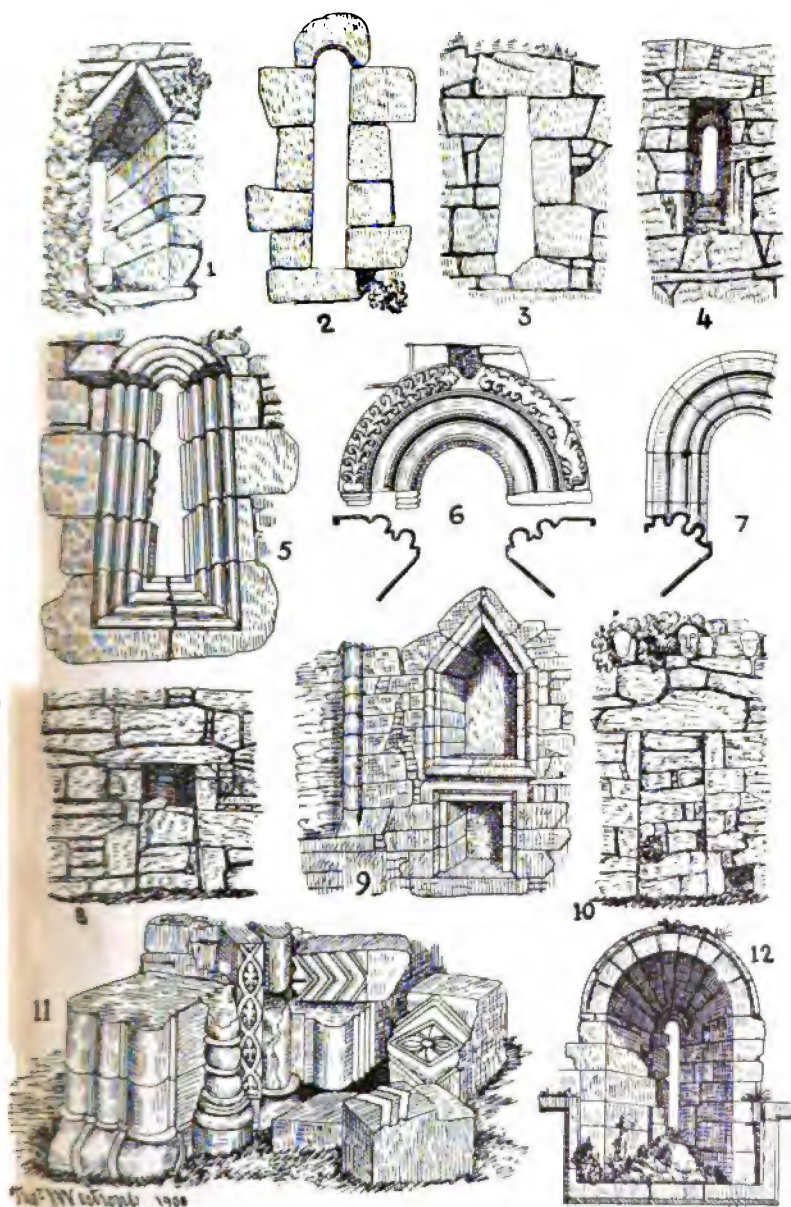
NOUGHAVAL CHURCH, COUNTY CLARE.



KILLEANY CHURCH AND ALTAR, COUNTY CLARE.

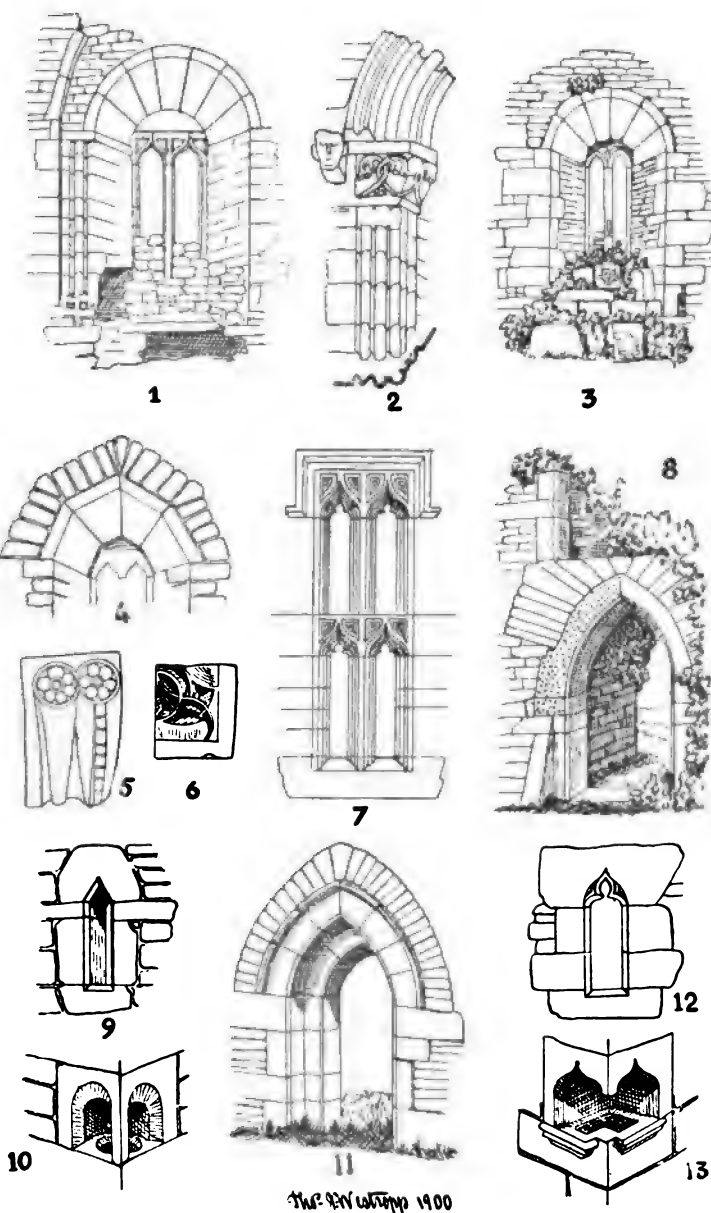


KILCREDAUN CHURCH, COUNTY CLARE.



DETAILS OF EARLY CHURCHES, COUNTY CLARE.

(Description on p. 177.)



DETAILS OF GOTHIC CHURCHES, COUNTY CLARE.

(Description on p. 177.)



MONDAY, APRIL 10, 1899.

RIGHT HON. THE EARL OF ROSSE, K.P., F.R.S., President, in the Chair.

Dr. Henry Pomeroy Truett, D.L., and Rev. Henry William Lett, M.A., signed the Roll and were admitted Members of the Academy.

Mr. Josias Gilbert Smyly, M.A., F.T.C.D., was elected a Member of the Academy.

Mr. John Ribton Garstin, F.S.A., read a Paper "On an Effigy of a Fifteenth-century Archbishop of Dublin."

Professor Friedrich Blass, of Halle, HON. M.R.I.A., read a Paper on "The Greek Text of St. Mark's Gospel."

A letter from the Vice-Chancellor of Cambridge University was read inviting the Royal Irish Academy to take part in the celebration of the Jubilee of the Professorship of Sir George Gabriel Stokes, Bart., F.R.S., on the 1st and 2nd June, 1899, and to appoint two delegates to represent the Academy on that occasion.

On the motion of Rev. Dr. Salmon, Provost of Trinity College, seconded by Dr. O'Donovan, the Earl of Rosse, K.P., F.R.S., President, and Professor G. F. FitzGerald, F.R.S., were appointed the Academy's delegates.

[The delegates subsequently attended the festival and presented the following Address of congratulation :—

"ACADEMIA REGIA HIBERNICA

"GEORGIO GABRIELI STOKES, *Baronetto*,
S.P.D.

"Cum Tu, vir doctissime, per quinquaginta annos, grande mortalis aevi spatium, Scientiae Mathematicae apud Cantabrigienses summa laude summaque dignitate Professor Lucasianus iam praefueris, Academia Regia Hibernica hoc tam fausto die, gratulatione, honore, observantia Te prosequitur laeta lubens meritum.

"Memor enim quam longe lateque Tu Scientiæ fines promoveris, dum quibus legibus rotentur liquores liquido, quibus rationibus emitantur radii lucis dilucide docueris, hæc Academia, ipsa pro sua parte Scientiæ cultrix et fautrix, folium suum coronæ illi viridissimæ lubenter addit quæ hoc die festo Tibi per orbem terrarum ut dignissimo nectitur: votumque facit ut Tibi per multos annos superstiti ita in tempore venturo ut in decem lustris tam honeste peractis omnia sint bona, fausta, felicia.

"Scribendo adfuerunt,

"ROSSE, *Præses*,

"JOHANNES H. BERNARD, *ab actis*.

"D. DUBLINI, a.d. III. Kal. Iun.

"MDCCCXCIX."]

MONDAY, APRIL 24, 1899.

MR. JOHN RIBTON GARSTIN, D.L., F.S.A., Vice-President, in the Chair.

On the motion of Mr. T. F. Cooke-Trench, D.L., seconded by Professor J. P. O'Reilly, C.E., it was unanimously resolved: "That the Royal Irish Academy desires to place on record its deep sense of the loss it has sustained by the death of Dr. William Frazer, Librarian of the Academy, who had been for over thirty-three years a Member of the Academy and for eighteen a Member of Council; and a frequent contributor of Papers to its meetings. The Academy tenders its sincerest sympathy to Mrs. Frazer and the other members of his family in their bereavement."

Professor J. P. O'Reilly, C.E., read a Paper on "Volcanic Eruption Dates and their Concordance with the Sun-Spot Period."

Mr. Thomas J. Westropp, M.A., read "Notes on some of the Lesser Castles or 'Peel Towers' in County Clare."

MONDAY, MAY 8, 1899.

LORD WALTER FITZGERALD, and subsequently DR. BENJAMIN WILLIAMSON, F.R.S., S.F.T.C.D., Vice-President, in the Chair.

MR. JOSIAS GILBERT SMYLY, M.A., F.T.C.D., and MR. HUGH ALLINGHAM signed the Roll, and were admitted Members of the Academy.

Read the following letter :—

“ 2, ROXBOROUGH-TERRACE, ROSTREVOR,
“ *May 5th*, 1899.

“ MRS. FRAZER and the family wish to return their most sincere and grateful thanks to the Members of the Royal Irish Academy for the kind sympathy they have showed in their great and sad loss.

“ DR. FRAZER always took the keenest interest in all Science and Art, and highly valued the many friends he had amongst the Members of the Academy.”

A ballot was opened for the election of one Member of Council to fill the vacant place on the Committee of Polite Literature and Antiquities. MR. MOORE and MR. GORE were appointed scrutineers.

Prof. T. JOHNSON, D.SC., read a Paper prepared by himself and MR. H. HANNA, M.A., B.SC.—“ The Irish Phæophyceæ.” (Fauna and Flora Committee Report.)

MR. A. R. NICHOLS, B.A., read a further part of the Fauna and Flora Committee Report, entitled “ A List of the Marine Mollusca of Ireland.”

Prof. C. J. JOLY, M.A., F.T.C.D., Royal Astronomer of Ireland, read—
“ A Note on Astatics.”

MR. J. G. SMYLY, M.A., F.T.C.D., read a Paper—“ Certain Curves connected with the double Normals of plane bicircular Quartics and Cyclides.”

The scrutineers having reported the result of the ballot, MR. ROBERT COCHRANE, F.S.A., was declared to be elected to the vacant seat on the Council.

A ballot was then opened for the election of a Librarian, and subsequently, on the report of the scrutineers, Professor Grenville A. J. Cole, F.G.S., was declared duly elected to that office.

On the motion of Mr. G. L. Cathcart, M.A., F.T.C.D., seconded by Rev. Dr. Bernard, F.T.C.D., Secretary, Dr. Atkinson, Secretary of the Council, was elected a Representative of the Academy on the Board of Visitors of the Science and Art Museum, &c., Dublin, in the room of the late Dr. Frazer.

MONDAY, JUNE 12, 1899.

MR. JOHN RIBTON GAESTIN, D.L., F.S.A., Vice-President, in the Chair.

Mr. Edward Parnall Culverwell, M.A., F.T.C.D., signed the Roll and was admitted a Member of the Academy.

Mr. Henry A. Shuckburgh Upton was elected a Member of the Academy.

Mr. E. P. Culverwell, M.A., F.T.C.D., read a Paper "On the Conditions for Maximum and Minimum Solutions in the Calculus of Variations for Finite Variations."

The Secretary read for Mr. W. J. Knowles a Report by Mr. Knowles, Mr. W. H. Patterson, Mr. R. L. Praeger, and Mr. F. J. Bigger, on "Prehistoric Remains in the neighbourhood of Roundstone, and on the sea-shore along Mannin and Ballyconneely Bays."

The Secretary read for Prof. Marcus Hartog, D.Sc., an *ad interim* Report on his Researches into the Physical Structure of Protoplasm.

The Treasurer read (in accordance with By-law 3, Chapter III.) the list of Members in arrear.

The Treasurer laid on the table—

(a). The Audited Accounts for 1898-9.

(b). The Estimate for 1899-1900.

The following grants for Scientific Investigation, recommended by the Council, were approved :—

£45 to a Committee, consisting of Dr. R. F. Scharff, Mr. F. W. Moore, Mr. R. L. Praeger, Mr. G. Pim, Prof. T. Johnson, Dr. E. J.

M'Weeney, Mr. G. H. Carpenter, Mr. G. E. H. Barrett-Hamilton, Mr. D. M'Ardle, Mr. A. R. Nichols, Mr. R. J. Usher, and Mr. N. Colgan, to enable them to carry on their researches into the Fauna and Flora of Ireland during the present year.

£20 to **Prof. John Joly, F.R.S.,** to carry out experiments on the activity of sea-water as a chemical denuding agent.

£15 to **Prof. Cole** for the investigation of the ancient rocks, regarded as archæan, in the district north of Lough Erne, and between Omagh and Ballyshannon.

£45 to **Prof. T. Preston, F.R.S.,** in aid of his researches on Radiation Phenomena in a strong Magnetic Field.

£25 to a Committee consisting of **Prof. Cunningham, F.R.S., Prof. Haddon, F.R.S., and Dr. C. R. Browne,** to assist them in carrying on the work of the Anthropometrical Laboratory, and the Ethnographical Survey of Ireland.

MONDAY, JUNE 26, 1899.

RIGHT HON. THE EARL OF ROSSE, K.P., F.R.S., President, in the Chair.

Mr. R. Russell M.A., F.T.C.D., read a Paper on "The Geometry of Surfaces derived from Cubics."

Rev. Francis E. Clarke, M.D., LL.D., read—Notes on the Cromlech of Tinnecarra, near Boyle.

Dr. R. F. Scharff read, on behalf of **Prof. W. A. Herdman, F.R.S., E. T. Browne, B.A., J. C. Thompson, F.L.S., F. W. Gamble, M.Sc., J. T. Cunningham, M.A., W. J. Beaumont, B.A., and Prof. F. E. Weiss, F.L.S.—**a Paper on "The Flora and Fauna of Valencia Harbour, Ireland."

A Bronze Caldron, found in the County Westmeath, sent for exhibition by **Mr. H. A. S. Upton, M.R.I.A.,** was exhibited and described by **Mr. Coffey.**

A Bronze Spear-head, and three Boars' Tusks found near Belvedere, County Westmeath, presented by **Charles B. Marley, Esq., D.L.,** were also exhibited.

The thanks of the Academy were voted to Mr. Marley for his donation.

The following grants for Scientific Investigation, recommended by the Council, were approved :—

£12 to a Committee consisting of Rev. W. P. Carmody, Prof. Rhys, and Rev. Dr. Buick, to assist them in the Investigation of Ogam stones, and other Antiquities found at Connor.

£10 to a Committee consisting of Mr. R. Cochrane, Prof. E. P. Wright, and Prof. Rhys, to assist them in the Investigation of an Ogam stone, and other Antiquities found near Ballyhaunis.

MONDAY, NOVEMBER 13, 1899.

MR. JOHN RIBTON GARSTIN, D.L., F.S.A., Vice-President, in the Chair.

By permission of the Academy, the Rev. H. J. Lawlor, D.D., read a Paper on "The Kilcormac Missal."

The Secretary read for Prof. John Rhys, LL.D., a "Report on the Island Ogam near Ballyhaunis."

A Gold Armlet and various Bronze and Stone objects, recently acquired for the Museum, were exhibited.

A special vote of thanks was passed to the Right Rev. Dr. Day, late Bishop of Cashel, for his donation to the Library of a copy of the Old Testament in Irish, Bishop Bedell's translation, edition of 1685, and the New Testament in Irish, William O'Donnell's translation, edition of 1681.

THURSDAY, NOVEMBER 30, 1899.

(STATED MEETING.)

MOST REV. DR. DONNELLY, Lord Bishop of Canea, Vice-President, and subsequently PROF. J. P. O'REILLY, in the Chair.

Miss Margaret Stokes, Hon. M.R.I.A., read a Paper on "The High Crosses of Moone, Drumcliff, Termonfechin and Killamery."

Dr. Frederick T. Trouton, F.R.S., read a Paper on "Latent Heat of Evaporation of Saline Solutions."

A vote of thanks was passed to Mr. G. W. Miller for Drawings of Plans of Portumna Castle and of Kilkea Castle, presented by him to the Library.

MONDAY, DECEMBER 11, 1899.

MR. JOHN RIBTON GARSTIN, D.L., F.S.A., Vice-President, and subsequently DR. BENJAMIN WILLIAMSON, F.R.S., S.F.T.C.D., Vice-President, in the Chair.

Rev. Hugh Jackson Lawlor, D.D., was elected a Member of the Academy.

By permission of the Academy, Dr. Henry H. Dixon read a Paper on "The first Mitosis of the Spore-mother-cells of *Lilium*."

Prof. Charles J. Joly, M.A., F.T.C.D., Royal Astronomer of Ireland, read a Paper on "Applications of Hamilton's Operator ∇ in the Calculus of Variations."

Mr. George H. Kinahan, C.E., read a Paper on "The Beaufort Dyke or Gulch of Shifting Sand off the Coast of the Mull of Galloway."

MONDAY, JANUARY 22, 1900.

DR. W. J. O'DONNAN, and subsequently DR. B. WILLIAMSON, F.R.S., Vice-President, and subsequently MOST REV. DR. DONNELLY, Bishop of Canea, Vice-President, in the Chair.

Rev. Hugh Jackson Lawlor, D.D., signed the Roll, and was admitted a Member of the Academy.

By permission of the Academy Rev. W. R. Westropp Roberts, M.A., F.T.C.D., read a Paper "On the Reduction of the Integral—

$\int \frac{\phi(z) dz}{\psi(z) \sqrt{f(z)}}$ to a number of other Integrals of the form $\int \frac{dz}{(z-n) \sqrt{f(z)}}$, where $\phi(z)$ and $\psi(z)$ are rational and integral functions of (z) and $f(z)$, a polynomial of the degree $2m$."

Prof. J. P. O'Reilly, C.E., read a Paper on "The Epidiorites and Mica-schists of Killiney Park, Co. Dublin."

Mr. Edward J. Gwynn, M.A., F.T.C.D., read his first Todd Memorial Lecture. *Subject* :—"The Dindsenchas of Tara."

A special vote of thanks was passed to Mr. Seaton F. Milligan, M.R.I.A., for his donation to the Academy's Museum of an ancient gong or church bell. This object is a circular disc of a whitish bronze, $\frac{3}{4}$ of an inch thick, 3 feet 4 inches in diameter, and weighs 1 cwt. 2 qrs. and 4 lbs. It was used as a church bell in the old church of Aughnamullen, near Ballybay, Co. Monaghan, until about forty years ago, when its place was supplied by an ordinary bell. It is stated to have been brought to the church about the time of the siege of Derry by the Rev. Paul Dane who was rector of Augnamullen at that time. When put on a stand and struck with a wooden mallet, it gives a good clear sonorous sound.

The following grant for Scientific Investigation recommended by the Council was approved :—£150 to Prof. C. J. Joly, Royal Astronomer of Ireland, for the purchase of a Coelostat and Long-focus Telescope for Photographing the Corona during the Total Eclipse of the Sun, of May, 1900.

On the invitation of the Königlich Preussische Akademie der Wissenschaften, Berlin, that the Royal Irish Academy should take part in their Bicentenary Festival on 19th and 20th March, 1900, Dr. Atkinson, Secretary of Council, was appointed a delegate from the Academy.

MONDAY, FEBRUARY 12, 1900.

DR. BENJAMIN WILLIAMSON, F.R.S., S.F.T.C.D., Vice-President, in the Chair.

Mr. Henry FitzPatrick Berry, M.A., and Mr. Michael Joseph M'Enery, B.A., were elected Members of the Academy.

Prof. C. J. Joly, M.A., F.T.C.D., Astronomer Royal of Ireland, read a Paper on "The place of the *Ausdehnungslehre* in the general Associative Algebra of the Quaternion type."

Prof. Grenville A. J. Cole, F.G.S., read a "Report on Metamorphic Rocks in eastern Tyrone and southern Donegal."

Edward J. Gwynn, M.A., F.T.C.D., read his second Todd Memorial Lecture. *Subject* :—"The poetical Dindsenchas."

Rev. J. P. Mahaffy, D.D., S.F.T.C.D., was appointed the Academy's second delegate to the Bicentenary Festival of the Royal Prussian Academy of Sciences, Berlin.

[The following is a copy of the letter forwarded to the Royal Prussian Academy on the occasion :—

"ACADEMIA REGIA HIBERNICA

"ACADEMIAE SCIENTIARUM REGIAE BORUSSICAE

"S. P. D.

"Non sine gaudio audivimus a vobis saecularia vestra altera hoc anno esse celebranda, in quibus agendis vobis continget rationes luculentissimas reddere quanta et quam praeclara opera ad scientias litterasque promovendas per ducentos annos publici iuris feceritis. Nos ipsi scientiis litterisque pro nostra parte dediti lubentissime agnoscimus quam multa ingenio, doctrinae, laboribus Societatis vestrae debeant viri docti qui per totum terrarum orbem in studiis altioribus versantur: et monumenta illa nobilissima, quae exegistis aere perenniora, Corpora Inscriptionum tam Graecarum quam Latinarum, et Aristotelis eiusque interpretum editionem praestantissimam, gratis animis cum omnibus eruditionis amatoribus reverentia quadam tacti certatim collaudamus. Itaque ut Academia vestra illustrissima in multa saecula vivat ad doctrinae incrementum et ad decus nominis Germanici vehementer optamus.

"Quod pro solita benignitate nos quoque laetitiae vestrae participes fieri voluistis, gratias vobis maximas agimus; et duos viros doctos vobis maiorem in modum commendamus, ROBERTUM ATKINSON, ab actis Concilii Academiae, virum linguae Hibernicae inter paucos peritum, et Reverendum JOHANNEM PENTLAND MAHAFFY, papyrorum investigatorem sagacem et interpretem subtilem, qui feriis vestris intersint et praesentes vobis verbis nostris gratulationes impertiant atque omnia fausta precentur. Valete.

"ROSSE, *Praeses Academiae.*

"JOHANNES H. BERNARD, *ab actis Academiae.*

"D. DUBLINI, a. d. IX Kal. Mart.

MDCCC."]

MONDAY, FEBRUARY 26, 1900.

MR. JOHN RISTON GARSTIN, D.L., F.S.A., Vice-President, in the Chair.

Mr. Henry F. Berry, M.A., and Mr. Michael J. M'Enery, signed the Roll and were admitted Members of the Academy.

Mr. Edward J. Gwynn, M.A., F.T.C.D., read his third Todd Memorial Lecture. *Subject*:—"The poetical Dindsenchas."

Prof. D. J. Cunningham, F.R.S., read for Prof. W. H. Thompson, M.D., a Report on "Degenerations resulting from Cortical Lesions of the Temporal Lobe."

Count Plunkett read for Mr. E. R. M'C. Dix, "A Note on the earliest Journals published in Dublin."

A special vote of thanks was passed to the Reception Committee of the Jubilee celebration of the Professorship of Sir George Gabriel Stokes, for their donation of a copy in bronze of the Gold Medal presented to him on the occasion by the University of Cambridge.

FRIDAY, MARCH 16, 1900.

RIGHT HON. THE EARL OF ROSSE, K.P., F.R.S., *President*, in the Chair.

A ballot was opened for the election of President and Council for the ensuing year: Mr. Craig and Mr. Lalor were appointed Scrutineers.

A ballot was opened for the election of Honorary Members: Mr. Cathcart and Dr. Tarleton were appointed Scrutineers.

The Report of Council was read by the Secretary, in the unavoidable absence of the Secretary of Council (being one of the Academy's delegates at the Bicentenary Festival in Berlin of the Royal Prussian Academy), and was unanimously adopted.

REPORT OF THE COUNCIL FOR THE YEAR 1899-1900.

Since the date of the last Report the following Publications of the Academy have been issued :—

Transactions, vol. xxxi.

Part 7. "On an Ancient Settlement in the South-west of the Barony of Corkaguiney, County of Kerry." By R. A. Stewart Macalister, M.A.

Proceedings.

Of the *Proceedings*, Third Series, Part 2 of Vol. v., was published in May, 1899, and contained the following Papers :—

"Notes upon a Rath Souterrain at Gurteen, Gainstown, County Westmeath." By Rev. William Falkiner, M.A.

"Notice of a Crannog at Lough-a-Trim, Killucan, County Westmeath." By Rev. William Falkiner, M.A.

"Self-parasitism of *Cuscuta reflexa*." By Henry H. Dixon, D.Sc.

"Note on some Shell Implements from Barbados." By C. G. Young, M.D.

"The Ethnography of Garumna and Lettermullen, in the County Galway." By Charles R. Browne, M.D.

"Report of the Work done in the Anthropometric Laboratory of Trinity College, Dublin from 1891 to 1898." By C. R. Browne, M.D.

"A List of the Round Towers of Ireland, with Notes on those which have been demolished, and on Four in the County Mayo." By Thomas J. Westropp, M.A.

"On a New Genus of Bacteria (*Astrobacter*)." By A. Vaughan Jennings, F.L.S., F.G.S.

"Report on Hepaticæ collected at Torc Waterfall, Killarney, in 1897." By David M'Ardle and Rev. H. W. Lett, M.A.

And Part 3 of Volume v. was published in November, 1899, containing the following Papers :—

'On the Greek Text of St. Mark's Gospel.' By Professor Friedrich Blass, Hon. Litt.D., Dublin.

- “On the Manufacture of a Gold Fibula purchased for the Museum of the Royal Irish Academy.” Notes communicated by Edmund Johnson, and W. Frazer, F.R.C.S.I.
- “On a Cist and Urns found at Greenhills, Tallaght, County Dublin.” By Lieutenant-Colonel G. T. Plunkett, R.E., Director of the Dublin Museum of Art and Science.
- “Notes on the Lesser Castles or ‘Peel Towers’ of the County Clare.” By T. J. Westropp, M.A.
- “Astatics and Quaternion Functions.” By Charles Jasper Joly, M.A., F.T.C.D.
- “A Note on certain Curves connected with the Double Normals of Plane Bicircular Quartics and Cyclides.” By J. Gilbert Smyly, M.A., F.T.C.D.
- “Notes on the Tinnecarra Cromlech near Boyle.” By the Rev. Francis E. Clarke, M.D., LL.D.
- “On the Conditions for Maximum and Minimum Solutions in the Calculus of Variations when certain Fluxions of the Variables have Finite and Arbitrary Variations.” By E. P. Culverwell, M.A., F.T.C.D.
- “On the Dates of Volcanic Eruptions and their Concordance with the Sun-Spot Period.” By Joseph P. O’Reilly, C.E.
- “Investigation of the Prehistoric Settlements near Roundstone, Connemara.” Report of the Committee, consisting of Messrs. W. J. Knowles, W. H. Paterson, R. L. Praeger, and F. J. Bigger.
- “Irish Phæophyceæ (Report of the Fauna and Flora Committee).” By Thomas Johnson, D.Sc., F.L.S., and Henry Hanna, M.A., B.Sc.; assisted by Miss R. Hensman and Miss M. C. Knowles.
- “Geometry of Surfaces derived from Cubics.” By Robert Russell, M.A., F.T.C.D.

Of the same volume, Part IV. will be laid on the table to-day, and Part V., completing the volume, is in the Press, and will be published shortly.

The following Papers will also be published shortly, in the *Transactions* :—

- “On the Latent Heat of Evaporation of Saline Solutions.” By Frederick T. Trouton, Sc.D., F.R.S.

"On the Kilcormac Missal." By Rev. Hugh J. Lawlor, D.D.

"Properties of the General Congruency of Curves." By Professor C. J. Joly, M.A., Royal Astronomer of Ireland.

"Report on Metamorphic Rocks in eastern Tyrone and southern Donegal." By Professor Grenville A. J. Cole, F.R.G.S.

The following Grants for Scientific Research, recommended by the Council, were sanctioned by the Academy :—

£45 to a Committee, consisting of Dr. R. F. Scharff, Mr. F. W. Moore, Mr. R. L. Praeger, Mr. G. Pim, Prof. T. Johnson, Dr. E. J. M'Weeney, Mr. G. H. Carpenter, Mr. G. E. H. Barrett-Hamilton, Mr. D. M'Ardle, Mr. A. R. Nichols, Mr. R. J. Ussher, and Mr. N. Colgan, to enable them to carry on their researches into the Fauna and Flora of Ireland during the present year.

£20 to Professor John Joly, F.R.S., to carry out experiments on the activity of sea-water as a chemical denuding agent.

£15 to Professor Cole, for the investigation of the ancient rocks, regarded as Archæan, in the district north of Lough Erne, and between Omagh and Ballyshannon.

£45 to Professor T. Preston, F.R.S., in aid of his Researches on Radiation Phenomena in a strong Magnetic Field.

£25 to a Committee, consisting of Professor Cunningham, F.R.S., Professor Haddon, F.R.S., and Dr. C. R. Browne, to assist them in carrying on the work of the Anthropometrical Laboratory, and the Ethnographical Survey of Ireland.

£12 to a Committee, consisting of the Rev. W. P. Carmody, Professor Rhys, and Rev. Dr. Buick, to assist them in the Investigation of Ogam stones, and other Antiquities found at Connor.

£10 to a Committee, consisting of Mr. R. Cochrane, Professor E. P. Wright, and Professor Rhys, to assist them in the Investigation of an Ogam stone, and other Antiquities found near Ballyhaunis.

£150 to Professor C. J. Joly, Royal Astronomer of Ireland, for the purchase of a Cœlostast and Long-focus Telescope for photographing the Corona during the Total Eclipse of the Sun, of May, 1900.

The preparation of slips for the Irish Dictionary has steadily progressed during the year under the direction of the editor.

The first series of Todd Memorial Lectures by the Todd Professor, Mr. E. J. Gwynn, M.A., on "A Portion of the Poetical Dindsenchas," has been printed, and is laid on the table to-day. The second series of lectures on the same subject, to be completed to-day, will be published during the incoming Academic year.

With respect to the publication of the *Annals of Ulster*, the expectations of the editor, Rev. Dr. MacCarthy, have not been realized to the full; but the *Index*, which was unfortunately destroyed by fire, has been reprinted, and the *Introduction* to the Annals is now in the Press. The speedy publication of the fourth volume, completing the entire work, may therefore be confidently anticipated.

Rev. Dr. Gwynn, Editor of *The Book of Armagh*, reports as follows:—

"The printing of *The Book of Armagh* is advancing steadily, though slowly. Of the 166 folios of the ms. which contain the entire New Testament, 95 are now in type. The remaining 71, at the present rate of progress, ought to be completed in five or six months. The rest of the book (the "Lives of St. Patrick and St. Martin") will require a shorter time. I think the whole will be printed before the end of 1900. But work which requires absolute accuracy cannot be hurried."

The annual visitation of the Academy's Museum took place on 9th February, 1900. The committee appointed for that purpose report that in Room II. a series of remains from various sites round the Irish coast has been arranged, and the collection of examples from Dundrum, Co. Down, has been increased by the addition of Mr. Ward's loan collection. In Room III. the Copper Celts have been arranged, and several of these have been analysed. The arrangement of coins and medals, a lengthy and difficult task, has yet to be carried out. A fine set of stone moulds for bronze daggers, &c., has been deposited on loan, and an instructive set of models to illustrate the making of the various kinds of torques has also been obtained. In Room IV., the Northern Pavilion, great advance has been made with the arrangement of the Christian antiquities. Specially designed cases have been made for the exhibition of the shrines so as to display the four sides of each object. The Ardagh finds have been placed together, and

some of the glass and other beads (not including amber) from crannoges have been classified, and identified, as far as possible, with the localities. It is hoped that the lighting of this room will be improved at no distant date.

The following Members have been elected since the 16th of March, 1899 :—

Henry Fitzpatrick Berry, M.A.

Rev. Hugh Jackson Lawlor, D.D.

Michael Joseph McEnery, B.A.

Josias Gilbert Smyly, M.A.

Henry A. Shuckburgh Upton.

The Academy has lost by death within the year eleven Members :—

Sir Thomas Newenham Deane, R.H.A., elected 10th January, 1876.

William Frazer, F.R.C.S.I., Librarian of the Academy, elected 14th May, 1866.

Right Rev. Charles Graves, D.D., F.R.S., President of the Academy 1861–1866, elected 24th April, 1837.

Richard Armstrong Gray, C.E., elected 27th June, 1887.

Edward Hamilton, M.D., elected 11th January, 1875.

John James Digges LaTouche, LL.D., elected 11th January, 1864.

Rev. Thomas Mills, M.A., elected 10th January, 1898.

Rev. Eugene O'Growney, elected 12th December, 1892.

Thomas Preston, D.Sc., F.R.S., elected 11th January, 1897.

Thomas Glazebrook Rylands, F.S.A., elected 14th December, 1885.

William Henry Stacpoole Westropp, L.R.C.S.I., elected 9th April, 1866.

The Academy has also lost by death three Honorary Members in the Section of Science :—

Sir Edward Frankland, K.C.B., elected 16th March, 1886.

Sir William Flower, K.C.B., elected 16th March, 1896.

Othniel Marsh, elected 16th March, 1880.

Charles Graves was born in Dublin in 1812. He was the youngest son of John Crosbie Graves, a member of the Irish Bar, and Chief Police Magistrate of this city. Having received his early education at a private school in England, he entered Trinity College. He became successively Scholar and Fellow, and in 1843 was elected Professor of Mathematics. He became a member of this Academy in 1837, was elected on the Council in 1844, Secretary of the Council in 1846, Secretary of the Academy in 1856, and, finally, President in 1861. He was appointed Dean of the Chapel Royal, Dublin, in 1860, and Bishop of Limerick in 1866.

His admission to our body took place at a time when, under the influence of Provost Bartholomew Lloyd, the Mathematical School of Trinity College was exhibiting a remarkable revival; and Hamilton, M'Cullagh, and Humphrey Lloyd were prosecuting with energy the researches with which their names are associated. The results at which they arrived were usually announced at our meetings. Graves was in intimate relation with these distinguished men, and, as their junior associate, naturally followed in their footsteps. He contributed to our "Proceedings" a great number of memoirs on subjects belonging to almost every province of Mathematical Science. Only a few of these can here be summarily noticed. In 1841 he published a translation of the two elegant treatises of Chasles on the Properties of Cones of the Second Degree and Spherical Conics, and appended to it a new method of treating curves traced on the sphere by the use of co-ordinates similar to the Cartesian. These researches he explained in communications to the Academy, and from them he was led to consider the geometry of curves traced on any surface, and in particular on surfaces of the second degree, and gave a demonstration of the celebrated proposition of Joachimsthal, from which is most easily deduced the beautiful theorem of our countryman, Michael Roberts, respecting the lines of curvature on the Ellipsoid.

Sir W. Hamilton's Calculus of Quaternions led many contemporary mathematicians to devise other systems involving new imaginaries, and Graves brought before the Academy a system of Algebraic Triplets of this kind; but though it was curious and interesting, he was himself the first to confess that it was far inferior "in power, symmetry, and flexibility" to the Quaternions. Other papers of his related to the theory of linear differential equations, to

the coefficients in the binomial theorem, and to the solution of the equation of Laplace's functions.

This Academy has always been marked by what Sir Samuel Ferguson used to call its encyclopedic character. It has sought to cultivate in an impartial spirit the various forms of study and research comprehended in its original plan—scientific, archæological, and literary. Graves combined in himself aptitudes and accomplishments of these several kinds, and in his official positions in connexion with our body he showed a respectful appreciation of every variety of intellectual distinction. This catholicity of mind was well exemplified by the two *Éloges* which he delivered from the Presidential chair—one of Sir William Hamilton, the other of George Petrie—able and just estimates of the dissimilar powers and achievements of those two eminent men.

The archæological subject which he himself most frequently dealt with in papers read before the Academy was that of the Ogham inscriptions, which has a fascinating interest for many minds. He first applied to the peculiar character in which they are traced the methods in general use for the development of writings known or presumed to be alphabetic, and thus confirmed the key to the interpretation of those symbols which is given in some of the old Irish books; and then proceeded to propose readings and explanations of a number of the inscriptions. Another question on which his characteristic sagacity and ingenuity were brought to bear with marked success was that of the determination of the age of the Book of Armagh.

Let us say, in conclusion, that the uniform courtesy of his demeanour, his dignity and impartiality in our chair, and his earnest and untiring efforts, at a critical period in the history of the Academy, to further by every means in his power its independence and its interests, entitle him to our respectful and grateful remembrance.

[LIST OF PAPERS BY DR. GRAVES.]

LIST OF PAPERS BY DR. GRAVES.

TRANSACTIONS.

1860. "On a previously Undescribed Class of Monuments" (Circular Markings).
 1878. "On an Ogham Inscription" (found in the parish of Minard, Co. Kerry).
 „ "On the Croix Gammée or Swastika."
 1887. "On the Ogam Monument at Kilcolman."
 1889. "On the Focal Circles of Spherical Conics."
 1892. "On an Ogam Inscription supposed to bear an Anglo-Saxon Name."

PROCEEDINGS.

In Science.

1841. "On certain general Properties of Cones of Second Degree."
 „ "The Application of Analysis to Spherical Geometry."
 1842. "On the motion of a Point upon the Surface of a Sphere."
 1844. "On the Algebraic Geometry of Curves traced upon given Surfaces."
 1844-5. "On Algebraic Triplets."
 1845. "On two methods of solving Biquadratic Equations."
 1846. "On Algebraic Curves and Surfaces."
 „ "On the motion of a Point in a Spherical Conic."
 „ "On Distributive Signs of Operation in Algebra."
 1847. "Observations on a Note of Professor MacCullagh."
 „ "On the Development of a Function in Factorials of the variable on which it depends."
 „ "On the Solution of Linear Differential Equations."
 1848. "On the Theory of Linear Differential Equations."
 „ "On Mathematical Expressions for Hypothetical and Disjunctive Propositions."
 „ "On Equation of Central Surface of Second Order."
 1849. "On Geodetic Lines of Surfaces of the Second Order."
 „ "Theorems of the principal Circular Sections of a Central Surface of Second Order, and Sphero Conics traced upon it."
 „ "A General Theorem in the Calculus of Quaternions."
 1851. "Elementary Geometrical Proof of Joachimsthal's Theorem."
 „ "On a Formula containing a Symbol which denotes Rotation through a given Angle, and round a given Axis by means of Rectangular Coordinates and Differential Coefficients."
 1852. "On a Generalization of the Symbolic Statement of Taylor's Theorem."
 1853. "Theorem as to Total Curvature of Bounded Portions of Surfaces."
 „ "On the Solution of Linear Differential Equations."
 1854. "On Interchange of Symbols in certain Symbolic Equations."

1855. "Solution of Equation of Laplace's Functions."
 „ "Sir Wm. R. Hamilton's Confirmation of Solution of Equation of Laplace's Functions."
 1856. "On a Communication of Dr. Boole (Development of a Function of a Quaternion)."
 1858. "A System of Imaginaries, analogous to those used by Sir Wm. Hamilton in his Calculus of Quaternions."
 1859. "Geometrical Method of representing the Sums or Differences of Arcs of any Curves."
 1865. "On a Theorem relating to the Binomial Coefficients."
 1890. "On the Plane Circular Sections of the Surfaces of the Second Order."

In Literature and Antiquities.

- 1846-7. "On the Age of the Book of Armagh."
 1847. "On a Gold Ornament."
 1848. "On Deciphering Secret Alphabetical Writings."
 „ "On an Ogham Inscription on a Brooch."
 „ "On the Ogham of the Newton Stone."
 „ "Account of Highland Society's Irish mss."
 1849. "On the Ogham Character."
 „ "Inscription on a Stone Cromlech."
 1850. "On certain Irish Manuscripts existing in the Seventeenth Century."
 „ "On the Cambray ms. of Irish Canons."
 1852. "On Affinities of certain Irish and Latin Words."
 „ "On Oghams in connexion with Crosses."
 1853. "On two Ogham Monuments."
 1854. "On the Comparison of Ancient Irish Adjectives."
 1855. "On the Oghams in the St. Gall Priscian."
 „ "On the Bressay Ogham."
 1859. "On a Gaulish Inscription."
 1860. "On an Undescribed Class of Monumental Stones, and Law of Alignment."
 1862. "On the Arrangement of Earthen Rathes."
 1863. "On some Notices of the Acts of St. Patrick in the Book of Armagh."
 1864. "On Inscribed Monuments in the County of Kerry."
 1867. "Observations on Mr. Brash's Paper 'On the Ogham Chamber of Drumlohan.'"
 1873. "Remarks upon an Ogham Inscription at Cahirciveen."
 1874. "Remarks on the Ogham Inscription (No. 1) at Monataggart."
 1884. "Remarks on an Ogham Monument found near Killorglin."
 „ "On the Identification of the Proper Names appearing on two Monuments bearing Ogham Inscriptions."
 1893. "On the Lignum Contensionis."
 1894. "On an Ogham Monument recently found in County Kerry."

William Frazer, born in Dublin in 1824, was a Member of the Royal Irish Academy for thirty-four years, having been elected in 1866. In 1881 he became a Member of Council, and at the time of his death, April 16th, 1899, he held the office of Librarian.

In 1848 he became a Licentiate of the Royal College of Surgeons. Ireland, of which he was elected a Fellow in 1872. The Royal Society of Antiquaries of Ireland elected him a Member of its body in 1887; he became a Fellow in 1895. The Society of Antiquaries of Scotland also elected him an Honorary Fellow in the year 1892.

The list of Dr. Frazer's Papers (*vide infra*) sufficiently indicates the wide scope of his antiquarian studies. His interest in every scrap of information that might be made to contribute to the study of archæology, extended far beyond the bounds of Irish archæology, so that it is to be regretted that he should not have been enabled to leave more of the results of his comparative studies in these branches of knowledge. His acquaintance with many curious and interesting peculiarities of the coins, implements, and customs of early periods lent considerable charm to his disquisitions. His sympathy with everything touching the ancient works of art in Ireland was very apparent; and he was always willing and eager to afford the Academy the best of his knowledge on all the points of archæological detail, on which he was often consulted, so that his loss in many of the practical matters of judgment such as the purchase of antiquities, will be deeply felt.

PAPERS PUBLISHED BY DR. FRAZER IN THE "PROCEEDINGS."

1868. On Chinese Porcelain Seals found in Ireland.

„ On the Discovery of three Earthen Vases at Palmerstown, Co. Dublin.

1872. On two Finds of Silver Coins of Edward I. and II.

1878. On a Copy of "The Life of the Virgin," by Albert Durer.

1879. On a Bronze Medallion of the "Delivery of Antwerp in 1577."

„ On an Early Irish Harp.

„ On a Bronze Bell and Sculptured Head of Stone found in the Church of Knockatempul, Co. Wicklow.

„ Description of a Sepulchral Mound near Donnybrook.

„ On certain papers relating to Lady Bellasyse.

1881. Description of a Himyaritic Seal engraved on Sard and on Babylonian Inscribed Cylinders.
- „ On an ancient Bronze Bracelet of Torque pattern.
- „ Further account of the Sepulchral Mound near Donnybrook.
1884. On Rock Crystal Globes or Spheres.
- „ On an ancient Cross-bough or “Latch.”
- „ Description of a large Silver Plaque commemorative of Martin Luther at Wittenberg, A.D. 1517.
- „ On a series of Playing Cards relating to the Political History of Dr. Sacheverell in the reign of Queen Anne.
1885. On a Shale Chark found in the Poddle River.
- „ On three Bronze Celts found in County Mayo.
- „ On an early Ecclesiastical Seal (probably 14th or 15th century).
1886. On the Dublin Stocks and Pillory.
1886. On a Bronze Cooking Vessel found in a bog near Kells.
1887. On the Brass Matrix of an Augustinian Seal.
1888. On Testoons of Henry VIII.
1889. On an Irish Crozier, probably the missing Crozier of St. Ciaran, of Clonmacnoise.
- „ On a Polished Stone Implement of novel form.
1890. On a series of Coloured Drawings of Scribed Stones in the Loughcrew Cairns by the late G. V. Du Noyer.
- „ Note on Medals of St. Vergil and St. Rudbert, struck at Salzburg.
1892. On “Sickles” (so called) of Bronze, found in Ireland.
- „ On a Skull from Lincoln, and on Irish Crania.
- 1895 (with E. Johnson). On five Gold Fibulæ lately discovered in the South of Ireland, and on the Art Processes used in their manufacture.
1898. (with E. Johnson). On the manufacture of a Gold Fibula.

Thomas Preston was born in Kilmore, county Armagh, on May 23rd, 1860. He graduated in the Royal University of Ireland in 1884, and in the University of Dublin in 1885. His academic career was highly distinguished; he was elected to a Science Scholarship in Trinity College in 1884, and in the year following he obtained Senior Moderatorships in Mathematics and in Experimental Science. His brilliant answering at the MacCullagh Prize Examination (1888),

his work on cones and spherico-conics in association with the late Bishop of Limerick, his paper "On the Motion of a Particle, and the Equilibrium of Flexible Strings on a Spherical Surface," published in the Transactions of this Academy, showed his special aptitude for mathematical study and investigation. In 1891 he was elected to a Fellowship of the Royal University and to the chair of Natural Philosophy in University College.

In 1890 he published his work, "The Theory of Light," which he followed up in 1894 with "The Theory of Heat." These books supplied a distinct want in English scientific literature; they are the only comprehensive works on light and heat that have yet appeared in our language. They are, however, more than mere works of reference, more than critical résumés of the development of two great branches of physics; and the maturer work, "The Theory of Heat," will long remain a model on account of the philosophic spirit of its method and the singular beauty of its style.

In 1894 he was offered the Science and Art Inspectorship for Ireland under the South Kensington Department, and after mature deliberation the offer was accepted. In 1897 he became a Member of this Academy. He was elected Fellow of the Royal Society in 1898, and in the same year the Senate of the Royal University conferred upon him the degree of D.Sc. *honoris causa*. For his distinguished researches on "Radiation Phenomena in a Strong Magnetic Field," the Council of the Royal Dublin Society awarded him the Boyle Medal only last month.

In March, 1897, Dr. Zeeman had announced his discovery that, when a source of light is placed in a strong magnetic field, the spectral lines become sensibly modified in appearance. From theoretical considerations Lorenz at once predicted and Zeeman verified by the use of a Nicol's prism that each modified line consisted of three lines polarized in a definite manner. Preston perceived that in this discovery lay the key to a new line of inquiry into the constitution of matter. By increasing the strength of the magnetic field and by using a powerful spectroscope, he succeeded in separating the lines without the use of a nicol, and he was the first to illustrate the effects by photography. He found there were deviations from the standard triplet type; some lines became quartets, some sextets, and some

were modified in other ways. He communicated the results to the Royal Dublin Society in December, 1897, and he exhibited photographs of the triplets and quartets, displaying the close analogy between certain lines of zinc and of cadmium. In this paper he wrote :—" It is clear, therefore, that the magnetic effect depends not so much on the wave-length of the spectral line as on some hidden quality which we may refer to the character of the line," and "perhaps it might be possible to group the spectral lines of each substance into sets, so that some law of wave-length might apply to the lines of each set."

In order to study the various types systematically, and in the hope of finding some general law connecting lines of a common type, Preston had an exceedingly powerful electro-magnet constructed, according to an original design. This instrument in every way acted up to his expectations. By its aid he was enabled to extend the classification of the lines, and he enunciated a very important general law. He found the lines of a given spectrum could be grouped in sets so that the ratio which the change of wave-length produced by the magnetic force bears to the square of the wave-length is constant for each set, and he found moreover that this ratio is the same for corresponding sets of lines in the spectra of different substances. He considered this pointed to a composite structure of the chemical elements, and thought it possible that to each type of line corresponded a kind of stuff more simple than the element.

Dr. Preston's death is a cause of lasting regret to the Academy, and a serious loss to Science.

It was proposed by Dr. Greenwood Pim, and seconded by Judge Kane, and adopted—

That in the event of Her Majesty the Queen being graciously pleased to receive addresses on the occasion of her visit to Ireland, an Address of welcome be presented by the Academy, and that the officers be requested to prepare and submit a draft Address.

The following draft Address was adopted, on the motion of the Secretary, seconded by the Treasurer.

“ TO THE QUEEN’S MOST EXCELLENT MAJESTY.

“ MAY IT PLEASE YOUR MAJESTY,

“ We, the President and Members of the Royal Irish Academy, beg to offer Your Majesty our most respectful and loyal welcome on the occasion of Your Majesty’s gracious visit to Ireland.

“ The Royal Irish Academy was founded more than a century ago by Your Majesty’s royal ancestor King George III., for the promotion of the study of Science, Literature, and Archæology; and we trust that the long roll of distinguished men who have contributed to our *Transactions* is an indication that the Charter which was then granted to the Academy has been highly valued, and has contributed in no small degree to the intellectual progress of Ireland.

“ The period of Your Majesty’s glorious reign has been one of unexampled activity in the field of scientific and literary research; and we trust that Your Majesty’s patronage under which the Academy has been privileged to work for many eventful years may long be continued to the benefit of learning and culture, as well as of all that promotes the social and moral well-being of our countrymen.

“ We desire to thank Your Majesty for the opportunity which has been afforded us of expressing our continued devotion and loyalty to Your Majesty’s person.”

By-law 6, Chapter IX., being suspended, the President called on Mr. Edward J. Gwynn, M.A., F.R.C.D., to read his fourth Todd Memorial Lecture on “ Portions of the Poetical Dindsenchas.”

The *Todd Lectures*, vol. vii., on “ Poems from the Dindsenchas,” by Edward Gwynn, M.A.; and Part 4 of vol. v. of the *Proceedings*, Third Series, were laid on the Table.

On the Report of the Scrutineers, the following were declared elected as Honorary Members in the Section of Science :—

Aleksandr Onufrijevic Kovalevskij, *St. Petersburg.*

Jean Albert Gaudry, *Paris.*

Peter Guthrie Tait, *Edinburgh.*

Jacob Heinrich van’t Hoff, *Berlin.*

Joseph John Thompson, *Cambridge.*

On the Report of the Scrutineers the following were declared duly elected as President and Council for the year 1900-1901 :—

PRESIDENT.

RIGHT HON. THE EARL OF ROSSE, K.P., LL.D., F.R.S.

COUNCIL.

Committee of Science.

Francis A. Tarleton, LL.D., D.SC.
Benjamin Williamson, D.SC., F.R.S.
George L. Cathcart, M.A.
George Henry Kinahan, C.M.
Robert F. Scharff, B.SC., PH.D.
Greenwood Pim, M.A.
Grenville A. J. Cole, F.G.S.
Charles J. Joly, M.A.
Frederick W. Moore, F.L.S.
Frederick T. Trouton, D.SC., F.R.S.
Daniel J. Cunningham, M.D., F.R.S.

Committee of Polite Literature and Antiquities.

Robert Atkinson, LL.D.
Rev. Maxwell H. Close, M.A.
Louis C. Purser, M.A., LITT.D.
Most Rev. Bishop Donnelly, D.D.
Lord Walter FitzGerald.
Rev. J. H. Bernard, D.D.
John Ribton Garstin, M.A., F.S.A.
Thomas J. Westropp, M.A.
Rev. Edmund Hogan, S.J., D.LITT.
Robert Cochrane, F.S.A.

A ballot was opened for election of Officers, and Mr. J. J. Lalor, and Rev. Dr. Lawlor, were appointed Scrutineers.

The President, under his hand and seal, nominated and appointed the following as Vice-Presidents for the year 1900–1901 :—

Dr. Benjamin Williamson, F.R.S., S.F.T.C.D.

John Ribton Garstin, B.D., F.S.A., D.L.

Most Rev. Nicholas Donnelly, D.D., Bishop of Canea.

Dr. Francis Alexander Tarleton, F.T.C.D.

The result of the ballot for election of officers was declared as follows :—

TREASURER—Rev. M. H. Close, M.A.

SECRETARY—Rev. J. H. Bernard, D.D.

SECRETARY OF THE COUNCIL—Robert Atkinson, LL.D.

SECRETARY OF FOREIGN CORRESPONDENCE—Robert F. Scharff, PH.D.

LIBRARIAN—Grenville A. J. Cole, F.G.S.

ASSISTANT SECRETARY—Robert Macalister, LL.B.

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XII.

DEGENERATIONS RESULTING FROM LESIONS OF THE
CORTEX OF THE TEMPORAL LOBE. By W. H.
THOMPSON, M.D., Dunville Professor of Physiology, Queen's
College, Belfast.

(PLATES XIV., XV., AND EIGHT FIGURES IN TEXT.)

[COMMUNICATED BY PROFESSOR D. J. CUNNINGHAM, F.R.S.]

[Read FEBRUARY 27, 1900.]

THE investigation from which the following results have been obtained was begun as far back as the year 1892, in the Physiological Department of University College, London, under the guidance of Professor E. A. Schäfer. It was subsequently continued in the Physiological Laboratory of this College, where most of the work has in fact been carried out. The completion of the research has however been delayed by several interruptions.

Two preliminary communications dealing with some of the results obtained were made in 1892, one before the Pathological Society of London, the other before the Section of Anatomy and Physiology of the Royal Academy of Medicine, Dublin. A more detailed account was given at the meeting of the British Medical Association in Montreal in 1897.

OBJECTS OF THE RESEARCH.

At the time this inquiry was undertaken, much controversy existed concerning the seat of the cortical representation of the sense of hearing. Ferrier, Munk, and Schäfer, proceeding chiefly from the immediate results of extirpation of portions of the cortex of the temporal and occipital lobes, had all arrived at different, and in many respects contradictory views, regarding the precise region in which this sense is represented. Ferrier, as is well known, had located it in the upper end of the superior temporal convolution. Munk's auditory sphere, on the other hand, embraced portions of both temporal and occipital lobes; while Schäfer, without assigning the sensation to any

special part of the cortex, came to the conclusion that destruction of Ferrier's auditory centre, or even complete removal of the whole temporal lobe, did not impair the animal's sense of hearing.

Meanwhile the question had been attacked in another way. The experiments of Baginski,¹ who followed the degenerations resulting from destruction of the cochlea in rabbits, together with the researches of Flechsig² and Bechterew, who employed the now well known embryological method of the former investigator, showed that the auditory nerve of one side, is brought into connexion with the posterior tubercle of the corpus quadrigeminum, and with the internal geniculate body of the opposite side, by means of the contralateral fillet.

Prior to this, *V. Monakow*,³ who extirpated definite regions of the cortex of the brain in new-born animals, and afterwards followed the tracts of arrested development which resulted from these operations, had come to the conclusion that fibres from the ventral part of the temporal lobe end, some in the corpus geniculatum internum, others in the posterior tubercle of the quadrigeminate body, and still others pass directly down into the fillet.

The difficulties attendant upon the accurate tracing of conducting paths within the brain prevented these results from being finally accepted as conclusive, and since their publication many investigators have engaged in work more or less intimately connected with this field.

Held,⁴ who employed the newly introduced method of Marchi for showing degenerated tracts, was enabled to fully confirm the observations of Flechsig and Bechterew regarding the central connexions of the auditory nerve. Von Monakow, who likewise carried out an investigation on this part of the subject, has also arrived at results which, in the main, agree with those of Flechsig, Bechterew, and Held. He takes a different view, however, regarding the paths which the connecting fibres pursue in one part of their course, when passing from the auditory nuclei to the above-mentioned ganglia.

¹ *Baginski*, B. "Ueber d. Urspr. und centr. Verlauf d. Nerv. acust. d. Kaninchens." *Virch. Archiv*, 105, s. 28-46.

² *Flechsig*, P. (with Bechterew). "Zur Lehre. v. centr. Verlauf d. Sinnes-Nerv." *Neurol. Centr.*, No. 23, s. 545-551.

³ *V. Monakow*. "Ueber einige durch extirp. circumscr. Hirnrind-Reg. bedingt Entwicklungshemm. d. Kaninch-Gehirns." *Archiv f. Psych.*, xii. 1, s. 141; also xii., s. 535-549.

⁴ *Held*. "Die cent. Bahnen des Nerv. acust. bei d. Katze." *Archiv f. Anat. u. Physiol., Anat. Abt.*, 1891.

Results, also obtained by Zacher¹ from an examination of four brains with more or less extensive softening, contain the following conclusions which bear upon this subject. First, that the corpus geniculatum internum is directly connected with the two upper convolutions of the temporal lobe, to which it stands in the same relation that the external geniculate body bears to the occipital lobe. Second, that fibres from the temporal lobe descend through the outer fourth of the *pes pedunculi* as far as the upper part of the pons.

These results, though as we shall see in themselves perfectly correct, did not, however, do away with the necessity for further investigation, especially of an experimental nature, and accordingly the following research was undertaken.

METHODS EMPLOYED.

Monkeys and marmosets were exclusively employed. Of the former, *macacus rhesus*, *macacus sinicus*, and *callithrix personata*; of the latter, the common marmoset (*hapale jacchus*) were used.

After being anæsthetised, the temporal lobe was exposed by trephining, and a portion of the cortex removed down to the white centre. This was effected by means of a small Volkmann's scoop after the area had been circumscribed by a shallow incision. The whole operation was performed aseptically; after the cranial cavity had been opened, however, no fluid was employed for contact with the brain other than sterilised normal salt solution. The size and situation of the removed areas varied. Some were confined to Ferrier's auditory centre (apex of superior temporal convolution), but for the most part they involved a considerably greater extent of cortex. The posterior part of the temporal lobe was throughout avoided, so as to escape possible injury to the occipital cortex. Fig. 1 and Plate XIV., *a. b. c. d.* represent the areas removed in certain of the experiments.

In most of the experiments the motor area was not exposed, and was never actually injured in any way.

The wounds in every instance healed by first intention, and the animals were allowed to live for periods varying from nine to twenty-one days. They were then painlessly killed by an over-dose of chloroform, and the brains and spinal cords hardened in Müller's fluid. Subsequently thin slices were stained in Marchi's solution, and cut in celloidin.

¹ Zacher. "Beitr. z. Kenntn. d. Faserverlaufs in d. Pes Pedunc., sowie über die cort. Bezieh. d. Corp. Genic. Int." Arch. f. Psych. xxii. s. 654-698 (1891).

In some of the experiments, instead of actual removal of a portion of cortex, a subcortical lesion was made, and the piece left *in situ*. The results yielded differed in no way from those furnished by the more usual method of removal. Control experiments, in which the surface was merely exposed, were also performed. In all, the results of experiments upon thirty brains were investigated, fifteen of which were monkeys and a like number marmoset brains. Through these,

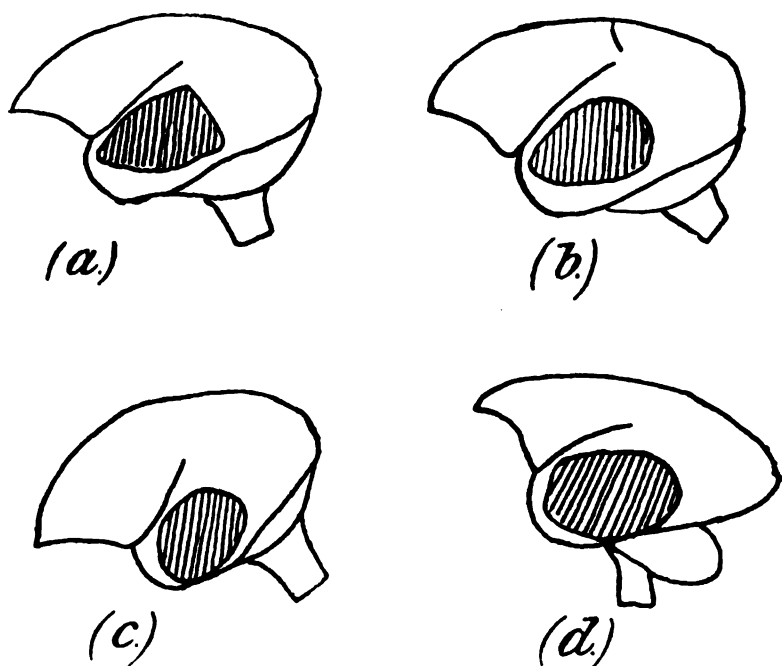


Fig. 1.—Showing tracings of lesions from four of the marmoset brains, viz. : marmosets v., vi., vii., viii.

sections were made in various directions, horizontal, coronal, and oblique. Before cutting, photographs or tracings of the lesions, or both, were made.

RESULTS OBTAINED.

Degenerated fibres were ascertained to exist in the following tracts and fibres:—

1. *Association Fibres*.—In the first instance short association fibres connecting the removed area with adjacent convolutions or portions of

cortex were found degenerated. But, in addition, longer association tracts were also found to present the same change. One of these was the *inferior longitudinal fasciculus* conveying degenerated fibres into

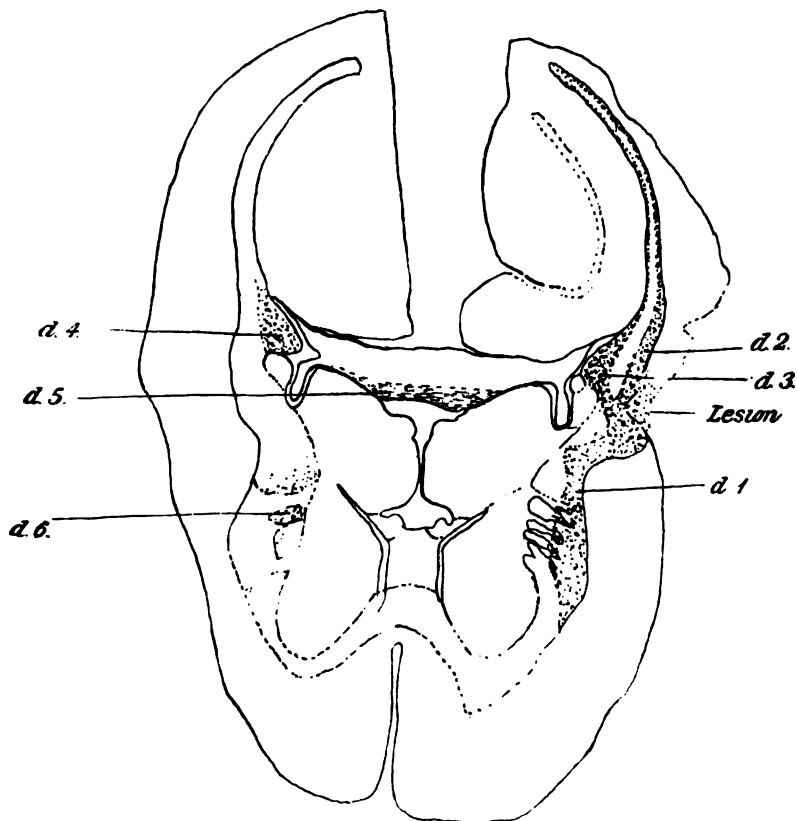


Fig. 3.—Horizontal section through the brain of marmoset vi. at the level of the upper part of the internal capsule ; showing sites of degeneration :—

- d. 1. internal capsule, side of lesion.
- d. 2. inferior longitudinal fasciculus.
- d. 3. tapetum, side of lesion.
- d. 4. tapetum, opposite side.
- d. 5. corpus callosum.
- d. 6. internal capsule, opposite side to lesion.

the occipital lobe (see d. 2. figs. 3 and 4). The other conveyed similar fibres to the parietal lobe—*parieto-temporal fasciculus*.

These results are confirmed by recent observations of *Pusateri*¹, who found degenerations in these tracts after removal of portions of Munk's auditory sphere in cats.

It must, I think, therefore be unquestionably accepted that the inferior longitudinal fasciculus is mainly, if not wholly, an association link between the occipital and temporal lobes. This, the usually accepted view, has recently been contested by *Flechsig*², who regards it as a projection bundle, descending from the occipital lobe. It has, however, on the other hand received confirmation from researches by *Sachs*³ into degenerations following softening of circumscribed areas of the cortex.

2. Commissural Fibres:—

(a) *Corpus callosum*.—In every case degenerated fibres were traced over the ventricular cavity towards the corpus callosum, across the posterior half of which they passed to reach the opposite side (see *d. 5*, fig. 1). In this commissure, they were found mostly to occupy the lower half of the vertical section. Having gained the opposite side, a number were seen to bend downwards and radiate into the cortex of the opposite temporal lobe. Some fibres turned forwards into the internal capsule. These will be referred to later.

But fibres of another set were also traceable from the seat of the lesion towards the region of the corpus callosum at its hinder part. Here they entered the bundle of fibres known as the tapetum (see *d. 3*, fig. 3), and at once separated into two groups. One of these remained on the side proximal to the lesion, and passed back into the occipital lobe, forming a layer immediately outside the posterior horn of the lateral ventricle. The other crossed over in the corpus callosum, and was found in the tapetum of the opposite side, along which its fibres were traced backwards and downwards into the occipital lobe, forming here also a layer placed closely external to the posterior horn (see *d. 4*, fig. 4), and internal to the so-called optic radiations of the white centre. In this way a communication is established between a given area of temporal cortex and the surfaces of both occipital lobes.

¹ *Pusateri, E.*, "Contrib. allo studio dell' origine del fascio pedunc. di Türk e del fascio long. infer." *Il Pisani*, s. 141-154.

² *Flechsig, P.*, "Die Localisation d. geistigen Vorgänge, insbesond. der Sinnes-Empfindungen d. Menschen." Leipzig, 1896.

³ *Sachs, H.*, "Ueber Flechsig's Verstand-Centren." *Archiv f. Mik. Anat.*, B. 48, p. 550-572.

Some light is also thrown upon the constitution of the tapetum, concerning which a good deal of difference of opinion exists amongst

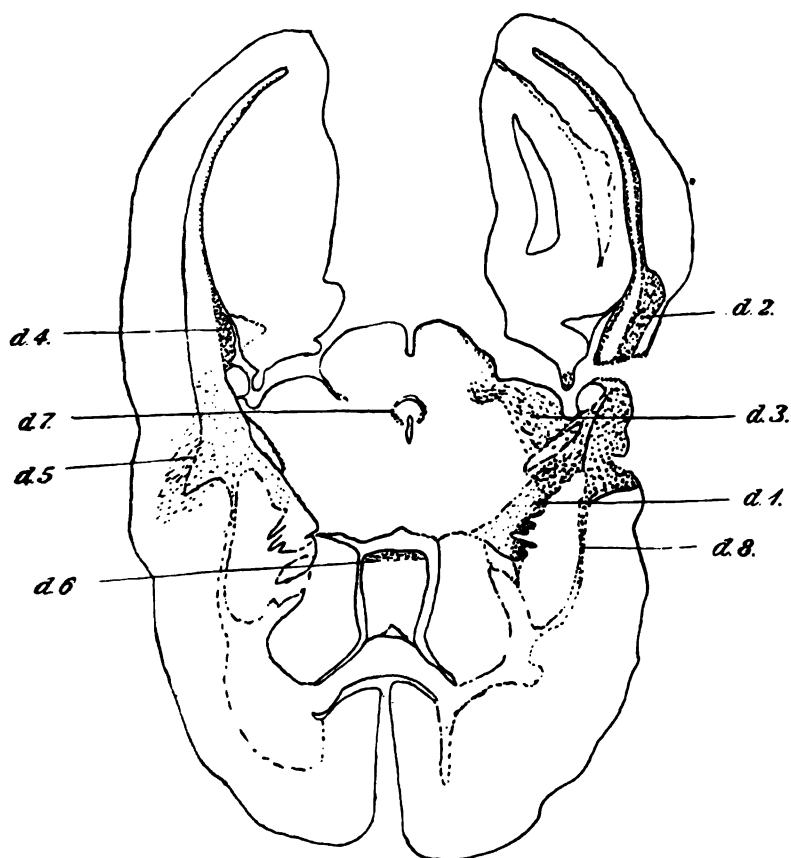


Fig. 4.—Horizontal section from same brain as fig. 3 at a lower level :—

d. 1., d. 2., d. 4., as in fig. 3.

d. 6. degenerations extending out into opposite temporal lobe.

d. 7. in posterior commissure.

d. 8. in external capsule.

cerebral investigators. *Wernicke*¹ believed it to be a set of fibres

¹ *Wernicke, Lehrbuch d. Gehirnkrankheiten. Leipzig, 1881.*

passing from the corpus callosum into the internal capsule. *Dejerine*¹, however, identifies it with the *occipito-frontal fasciculus* of *Forel*² and *Onufrowicz*; but while denying that it receives any fibres from the corpus callosum, or contributes any to the internal capsule, admits that it is made up of fibres from two different sources. Where the second set of fibres originates Dejerine does not state. *Mingazzini*³ corroborates the view that the tapetum contains two sets of fibres, one of which belongs to the fasciculus occipito-frontalis; the other is furnished by the corpus callosum. *Dotto* and *Pusateri*⁴ have also found that the corpus callosum contributes fibres to the tapetum. My own results fully substantiate this latter view, and further show at least one source from which the callosal fibres come. They do not lend any support to the belief that fibres of the tapetum descend into the internal capsule.

(b) *Anterior commissure*.—In all cases where the lesion of the temporal cortex was extensive, marked degeneration was found in the anterior commissure. Here the fibres occupied the inferior half of its vertical section (*Pars corticalis*) (see *d. 3*, fig. 5), and passed across to the opposite side, where they bent outwards and backwards, to end in the lower and front part of the cortex of the temporal lobe. To reach the anterior commissure, these degenerated fibres coursed from the seat of lesion, along the external capsule (see *d. 8*, fig. 4). But all of those found in the external capsule did not enter the anterior commissure. Many descended to the anterior and lower part of the temporal cortex on the side of the lesion. Through the external capsule and anterior commissure another bilateral connexion is thus established between the cortex of the temporal lobe and both hemispheres, comparable to that formed in a posterior direction by the fibres of the tapetum.

(c) *Fornix*.—In a small number of the brains examined, degenerated fibres were detected in the body of the fornix (see *d. 6*, fig. 4). They probably belonged to the set of fibres described by authors under the name of fasciculus pericavitaris medialis. They were traced forwards

¹ *Dejerine, J.*, Anatomie des Centres Nerveux. Tome 1, p. 760. Paris, 1895.

² *Forel*, "Fall von Mangel d. Balkens in einem Idiotenhirn," Tagebl. d. 54. Versamml. deutsch. Naturforsch. u. Aertzte in Salzburg, 1881.

³ *Mingazzini, G.*, "Osservaz. Amat. intern al corpo callose e ad alcuno formaz che con esso hanno rapporto." Ricerch. lab. di Anat. Norm. Univ. Roma., vol. vii., p. 5-28.

⁴ *Dotto and Pusateri*, "Sul decorso delle fibs. del corp. callos. e del psalterum." Rivist. di patol. Nerv e ment. ii., 2, 1897.

to the anterior end of the fornix, but neither their exact source of origin nor termination could be definitely determined.

(d) *Posterior Commissure.*—Some degenerated fibres were found in nearly all cases in the posterior commissure. Reference to these will again be made.

3. *Projection Fibres:* (a) *Retro-Lenticular Group.*—The largest group of degenerated fibres was in all cases traceable from the seat of injury through the corona radiata towards the internal capsule (see *d. 1.* fig. 3). On entering this system of fibres, the majority were found

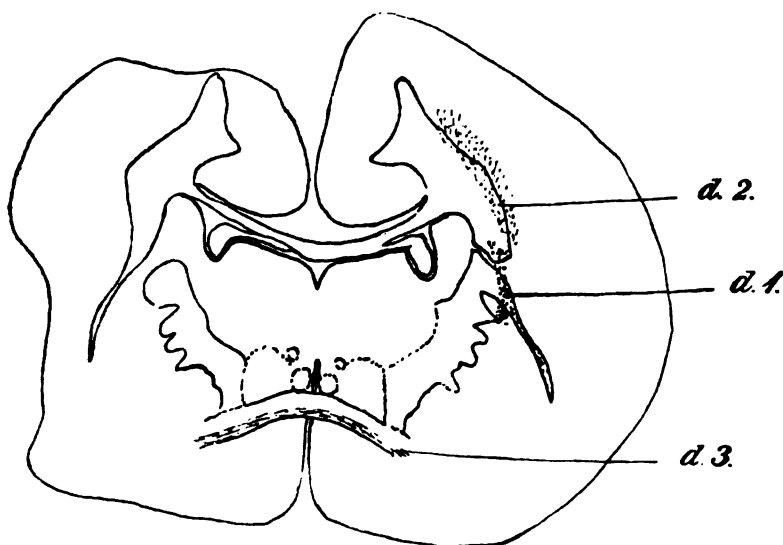


Fig. 5.—Vertical section through anterior part of brain of marmoset VII., showing sites of degeneration :—

- d. 1.* internal capsule.
- d. 2.* parieto-temporal fasciculus.
- d. 3.* anterior commissure.

to occupy the retro-lenticular segment of its posterior limb, some extending slightly forwards, however, between the posterior end of the lenticular nucleus and the optic thalamus. Certain of these fibres were seen to reach the capsule by piercing the back part of the lenticular nucleus. These, no doubt, correspond to the bundle which

*Flechsig*¹ has recently described in the brain of an eight months' foetus, and which passes from the internal geniculate body to the anterior transverse temporal gyri perforating the putamen in its course. This bundle was medullated before those of the fillet, which are contributed to the posterior corpora quadrigemina.

The above retro-lenticular group descended with the capsular fibres, and was found to be distributed in the following ways. Many of its fibres entered the optic thalamus (see *d. 3.* fig. 4), and of these some were not traceable further. Others traversed this body, and

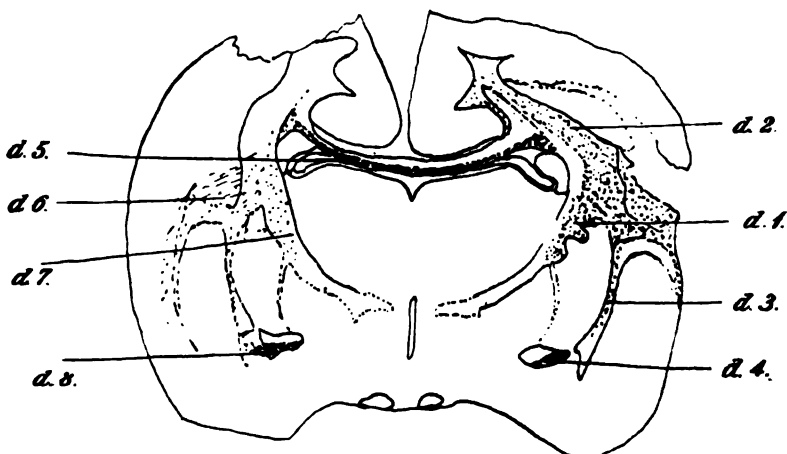


Fig. 6.—Vertical section through brain of marmoset VII., posterior to fig. 5:—

- d. 1.* and *d. 2.* as in fig. 5.
- d. 3.* external capsule.
- d. 4.* and *d. 8.* anterior commissure.
- d. 5.* corpus callosum.
- d. 6.* degenerations extending into opposite temporal lobe.
- d. 7.* opposite internal capsule.

appeared near the surface at a sulcus external to the anterior corpus quadrigeminus² (see fig. 4.) Some of these latter entered the anterior tubercle; the remainder were continued backwards to enter the posterior

¹ *Flechsig, P.*, Zur Anatomie des vord. Seh-hügelstiels des Cingulum u. der Acusticus-Bahn. Neurol. Centralb. xvi. 7, p. 290.

² Cf. *Boyce*, "Contrib. to the Study of: I. Some of the Decussating Tracts of the Mid- and Inter-brain; II. Of the Pyramidal System in the Mesenceph. and Bulb." Phil. Trans. ser. B. vol. 188, pp. 218, 219.

tubercle of the corpora quadrigemina. Still others were continued into the internal geniculate body. These are probably identical with the similar fibres found by Boyce after removal of one hemisphere. Boyce considers, however, that they end chiefly on the opposite side. In my experiments this was not so, unless one regards these in the posterior commissure as belonging to the same system (*vide infra*). My observations therefore confirm those of numerous observers. In addition to the names already quoted, may be mentioned those of *Dejerine*,¹ and of *Ferrier and Turner*,² whose publications have appeared since the present research was undertaken.

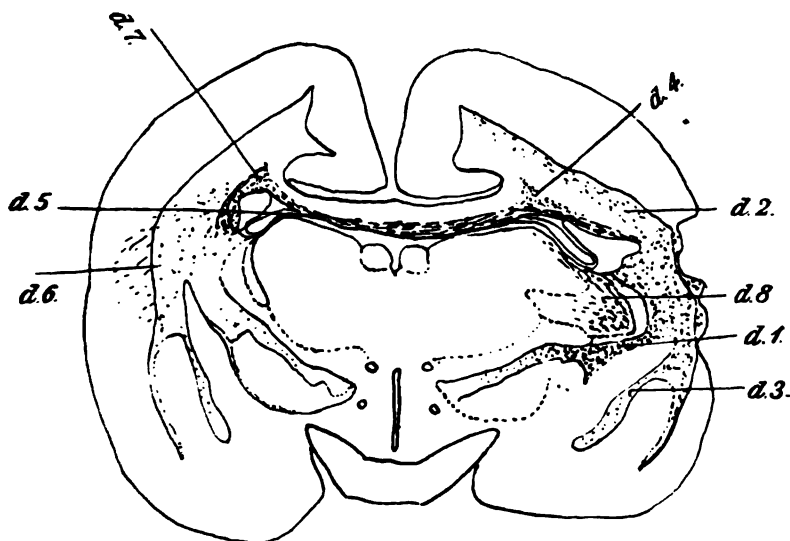


Fig. 7.—Vertical section through same brain as figs. 5 and 6 but posterior to fig. 6:—

d. 1., d. 2., d. 3., d. 5, and d. 6. same as in fig. 6.

d. 4. and d. 7. degenerations in tapetum.

d. 8. degeneration extending into optic thalamus.

It is interesting to note, at this stage, the existence of degenerated fibres in the posterior commissure (see d. 5. figure 8). These turned immediately downwards towards the dorsal grey nuclei of the

¹ *Dejerine, J.*, "Sur l'origine cert. et trajet intra-céréb. des fibres de l'étage inf. on pied du pédoncle cérébrale." *Mem. de la Soc. de Biol.* t. 5, p. 193-206.

² *Ferrier and Turner, W.A.*, "An experim. Research upon Cerebro-cortical afferent and efferent Tracts," *Pro. Roy. Soc.*, lxxii., p. 1.

mesencephalon. They were no doubt continued from the capsular set of fibres, and would thus supply the cross link for a bilateral termination of the sets of fibres with which we are now dealing. That such bilateral method is the general plan of connexion between a given portion of the cortex and other masses of grey matter I have little doubt.

Lastly, a very definite fasciculus continued downwards in the internal capsule, traversing the sub-thalamic segment of this tract (see *d. 1*. fig. 7), and from thence passed into the outer part of the pes pedunculi. In the sub-thalamic region the degenerated fibres were found to occupy the posterior part, distributed amongst certain of the bundles of fibres into which the system is here subdivided (see

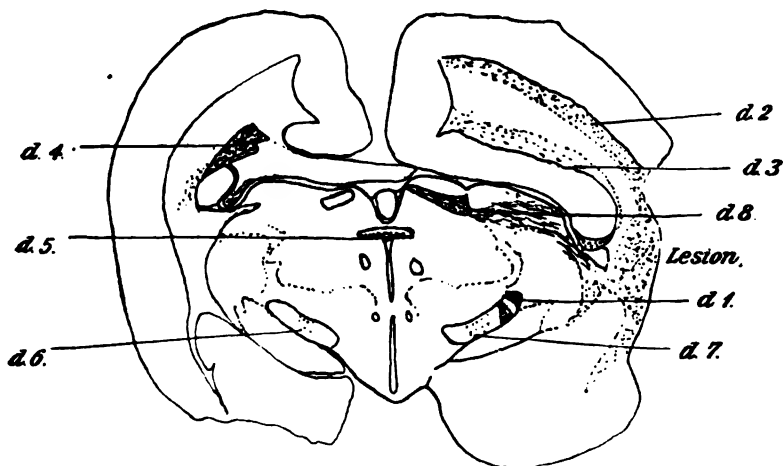


Fig. 8.—Vertical section through same brain as figs. 5, 6, and 7, but posterior to fig. 7; showing degenerations in:—

- d. 1.* posterior part of internal capsule (subthalamic region).
- d. 2.* inferior longitudinal fasciculus.
- d. 3.* extending from tapetum into occipital lobe.
- d. 4.* tapetum of opposite side.
- d. 5.* posterior commissure.
- d. 6.* and *7.* scattered through middle parts of internal capsules.
- d. 8.* traversing optic thalamus to reach corpora quadrigemina.

d. 1. fig. 8), but leaving others wholly free. These latter, which no doubt for the most part represent the projection system of the occipital lobe, were not always the most posteriorly situated. Quite a common arrangement was to find a small degenerated bundle

hindmost of all; then one or more larger bundles in which the fibres were normal; and in front of these the main set of degenerated fibres. The method of distribution was however subject to variation, and leads one to believe that the relative position of the various bundles is not absolutely constant.

The existence of a definite tract in the outer part of the pes pedunculi, descending from the temporal lobe, has been abundantly confirmed by many observers in recent as well as former years. Amongst later workers may be mentioned *Dejerine*,¹ *Van Gehuchten*,² *Ferrier and Turner*,³ *Pusateri*,⁴ and *Gerwier*,⁵ all of whom describe this tract. *Van Brero*⁶ stands alone in denying its existence. Nearly all of the authors mentioned consider that the bundle in question contains fibres from the temporal lobe only. *Gerwier*, on the other hand, assigns to it fibres from the occipital cortex as well. This view I can substantiate, both from the fact that amongst the degenerated fibres, numerous normal ones are found, and also from the results of experiments which I made on the occipital cortex in conjunction with *Dr. Cecil Shaw*,⁷ and published some years ago.

The fibres of this bundle when traced downwards were seen to enter a group of cells in the pons, situated external to the pyramidal bundles, and on the side of the lesion. The majority ended here, but some were found crossing in the trapezium to effect a connexion, no doubt, with the corresponding group of the opposite side. Thus, at this stage, a bilateral communication is again established. *Gerwier*⁸ also describes degenerated fibres crossing in the transverse bundles of the pons after lesions of the temporal cortex.

¹ *Dejerine, J.*, op. cit., p.

² *Van Gehuchten*, "Contrib. a l'étude du fais. pyram. Journ. de neurol. et d'Hypnol.," B. 1, p. 336-345; also 355-364.

³ *Ferrier and Turner, W.A.*, op. cit.

⁴ *Pusateri, E.*, "Contrib. allo studio dell' orig. del fascio pedunc. di Türk e del fascio long inf." Il Pisani, s. 141-154.

⁵ *Gerwier (Herwer) A. W.*, "Ueber die Endigung. in d. Hirnrinde des lat. Bündels an. d. Basis d. Pedunc. cereb." Ueberschau über Psych. neurol. u. experim. Psych. H., 3, s. 222 (Ref. in centr. Bl. f. Nervhke., 21. Jahrg., N.F., ix. 106, p. 687).

⁶ *Van Brero, P.C.J.* "La Termin. cort du fais. latéral pédonculaire." Nouv Iconogr. de la salpêtrière. Année 9, No. 4, p. 206-222.

⁷ *Shaw, C., and Thompson, W.H.*, "Desc. Degenerens. from Lesions of the cortex of the Occipital Lobe in Monkeys." Brit. Med. Journ., 1896, vol. ii., p. 630.

⁸ *Gerwier*, op. cit.

(b) *Scattered Capsular Fibres*.—To return to the internal capsule, the degenerated fibres described were not the only ones found in this structure. Others were scattered throughout the whole of its posterior segment. A similar distribution of degenerated fibres was found in the internal capsule on the side opposite to the lesion. There can be little doubt, therefore, that these latter crossed over in the corpus callosum,

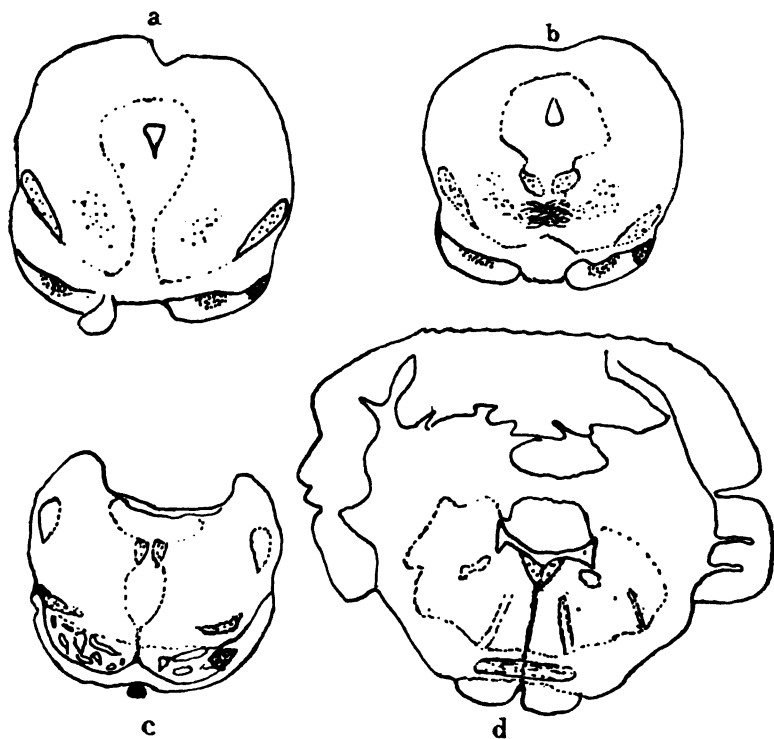


Fig. 9.—Dorso-ventral sections through mid-brain of same marmoset as preceding four figures, and through upper part of medulla of marmoset ix.

- (a.) through upper part of crura.
- (b.) through lower part of same.
- (c.) through pons varolii.
- (d.) through upper part of medulla of marmoset ix.

which, as we have seen, contained such fibres throughout the whole of its posterior half. Bilaterally degenerated fibres situated in both

THOMPSON—*Degenerations from Lesions of Temporal Lo*

internal capsules were also described by *Shaw and myself, loc. cit.*¹ after lesions of the cortex of the occipital lobe.

On tracing these fibres downwards they were found to diminish in number, and no doubt, as *Hamilton*¹ as well as *Ferrier and Turner*² state, by the contribution of some to the optic thalami.

Others were continued on into both peduncles where they occupied the middle regions of the crustæ (see *d. 6.* and *d. 7.* fig. 8). From here many were seen to enter the substantia nigra and terminate there. Such a mode of ending of pedal fibres has been observed by many investigators, and has recently been confirmed by *Dejerine and Long*.³ It was also described by *Shaw and myself*,⁴ in connection with similar fibres, degenerating after lesions of the occipital cortex. *Muratoff*,⁵ *Rothmann*,⁶ and *Boyce*⁷ have also observed fibres leaving the pyramidal system in the mesencephalon and passing towards the tegmentum. The remainder of these fibres were followed in gradually reducing numbers as low as the pons, beyond which they could not with certainty be traced. These latter, no doubt, ended at different levels in ventral grey matter on their way downwards. It will be noticed that this system also furnishes bilateral connexions between a given cortical area, and the grey matter of the basal ganglia, on the one hand, as well as that ventral aspect of the mesencephalon on the other. (See Plate XV.)

The view that the corpus callosum contains other than direct commissural fibres, which was first set forth by *Hamilton*,⁸ received much opposition. It has, however, been confirmed by the experiments of *Bianchi and d'Abundo*,⁹ in connexion with cortical localisation; by those of *Shaw and myself* on the occipital lobe; and also by those of *Ferrier and Turner*,¹⁰ on cortical afferent and efferent tracts.

¹ *Hamilton, D. J.*, "On the Corpus Callosum in the Embryo."—*Brain*, 1885, p. 145; also "The Corpus Callosum in the adult Human Brain," *Journ. of Anat. and Physiol.*, vol. xix., p. 385-414.

² *Ferrier and Turner, W. A.*, op. cit.

³ *Dejerine, J. E.*, and *Long, E.*, "Sur quelq. degener second du tronc enceph. de l'homme, &c.," *Compt. Rend. de la Soc. de Biol.* 30 Juillet. 1898.

⁴ *Shaw, C.*, and *Thompson, W. H.*, op. cit.

⁵ *Muratoff*, *Arch. f. Anat. in Physiol.*, 1893.

⁶ *Rothmann*, *Neurolog. Centralbl.*, June, 1896.

⁷ *Boyce*, op. cit.

⁸ *Hamilton, D. J.*, op. cit.

⁹ *Bianchi, L. e d'Abundo G.* "La degeneraz speriment. nel cervello e nel midollo spinale, &c.," *La Psychiatria*, 1886; also, "Die in das Gehirn u. Rückenmark herabsteig. Experim. Degener. als Beitrag z. Lehre v. cerebr. Lokalisation." *Neur.-l. Centr. bl.* v. 17, 1886.

¹⁰ *Ferrier and Turner*, op. cit.

Finally, *Dotto and Pusateri*¹ also support this view. These workers divided the corpus callosum at its hinder part in cats, and as a result were able to trace degenerated fibres downwards through the capsules into the mid-brain, and thence on into the medulla. Some were even followed into the spinal cord.

The liability to injury of adjacent parts of the motor cortex, which such experiments involve, has been pointed out by *Dejerine*,² and he attributes the degenerations which are traceable downwards to such cause.

I can confirm the statements of *Dejerine*, with regard to the liability to injury, but I would point out that such possibility did not arise in the present series of experiments, nor did it in those of *Ferrier and Turner*.

These descending callosal fibres can hardly be regarded as "projecting fibres" in the ordinary acceptance of this term. They are more to be considered as contra-lateral association fibres, a view which would equally apply to all of the fibres composing the corpus callosum.

Mid-brain.

Besides the degenerated fibres already mentioned as being found in the mid-brain, others also occurred in both fillets. These were detected in the highest sections made through the crura, and were even more numerous here than in sections lower down. They could not, therefore, have wandered in from other crural tracts, possessing such fibres, and must consequently have descended from the internal capsules. Further, from the fact that the numbers were about equal on both sides, from the first, I take it that those of the contra-lateral bundle must have crossed over in the corpus callosum.

The existence of fibres directly connecting the cortex with the mid-brain, through the medium of the internal capsule, has been shown by numerous observers. It was first stated by *V. Gudden*,³ and has since been confirmed by *Flechsigs*,⁴ and *V. Monakow*.⁵ *V.*

¹ *Dotto e Pusateri*. "Sul de corso delle fibre del Corp. Callos e del Psalterium." Riv di patol. nerve e ment, p. 69-70.

² *Dejerine, J.*, Anatomie des centres nerveux : Paris, 1895, p. 765.

³ *V. Gudden*, "Gesammelte Abhandlungen."

⁴ *Flechsigs*, "Zur Anat. u. Entwickl. Geschicht. d. Leitungs-B. i. Grossh. d. Menschen," Arch. f. Anat. u. Physiol. Anat. Abth., 1881, 12-75.

⁵ *Monakow*, "Experim. Beiträge z. Kenntn. d. Pyramiden u. Schleifenbahn" Referat. Neurol. Centr. 1883, s. 197-198; also *Ibid.* 1885, s. 265-268; also Deutsche Med. Wochenschr., xi., 5, s. 79.

Monakow found such fibres descending from the occipital lobe, and entering both upper and lower fillets. The fibres in my own experiments also occupied both these, though they chiefly lay in the upper fillet.

Bechterew,¹ *Edinger*,² *Obersteiner and Hill*,³ *Hösel*,⁴ *Ferrier and Turner*⁵ also adopt the view of cortico-mesencephalic fibres.

The fibres thus found in both fillets were never very numerous. They were traceable as low as the pons, diminishing on their way downwards, and no doubt ended in tegmental grey matter at successively lower levels, probably furnishing cortical connexions with the nuclei of sensory cranial nerves.

Thus throughout the whole chain of communicating links, a bilateral plan of connexion seems to be followed. One would almost *a priori* expect this. Moreover, it is interesting to note that this system of "sensory" communications has its homologue in the mode of termination of motor paths as *Muratoff*,⁶ *Sherrington*,⁷ and *Mellus*⁸ have all shown. These observers have found that the portion of the pyramidal tract destined for the lateral column when it reaches the medulla, and rises dorsally prior to decussation, divides into two portions; a larger which crosses over into the lateral column of the opposite half of the spinal cord, and a smaller which is continued on into the lateral column of its own side. It is, I should venture to say, quite likely that the direct pyramidal bundle also ends bilaterally. The manner in which the optic tract terminates in both retinae is not without interest to call to mind in this connexion. Since I have no doubt that the same rule applies to other areas of cortex than these of the temporal lobe, one might therefore formulate *a law of bilateral connection between a given portion of cortex, and all the more distantly situated masses of grey matter with which it is associated.*

¹ *Bechterew*, "Untersuchungen u. die Schleifenschicht." Verh. d. konigl. sachs. Gesellsch. d. Wissensch. z. Leipzig, 1885, i., ii., s. 241-244.

² *Edinger*, Vorlesungen über d. Bau d. Nerv. Centralorg., s. 415 6^{te} Aufl. Leipz. 1900.

³ *Obersteiner and Hill*, Anat. of the Cent. Nerv. Organs (Lond. 1890), p. 252.

⁴ *Hösel*. "Beiträge z. Anat. d. Schleifen." Neurol. centr. 1894, p. 546-549.

⁵ *Ferrier and Turner*, op. cit.

⁶ *Muratoff*, "Secund. Degener: nach Zerstörung d. Motor-Sphäre des Gehirns, &c.," Archiv f. Anat., 1893, s. 97.

⁷ *Sherrington*, "Note on Experim. Degener. of Pyramidal Tract.," *Lancet*, i, 1894, p. 265.

⁸ *Mellus*, "Prelim. Note on Bilat. Degener. in the Sp. Cord of Monkeys (*Macacus Sinicus*)," Proc. Roy. Soc. Lond., I.V (1894), p. 208.

SUMMARY OF RESULTS.

I. *Degeneration was detected in the following sets of fibres:—*(1) In short association, fibres passing to neighbouring parts of the cortex. (2) In longer association bundles, viz., inferior longitudinal fasciculus, and parieto-temporal fasciculus, leading to occipital and parietal lobes respectively. (3) In the tapetum, some of these fibres passed back into the occipital lobe on the side of the lesion; others crossed over in the corpus callosum to the tapetum of the opposite side, by which they were likewise conveyed backwards and downwards into the occipital lobe. (4) In the external capsule, some being distributed to the anterior and lower part of the cerebrum, others crossing over in the anterior commissure to the opposite temporal lobe. (5) In the corpus callosum, one set leading to the opposite temporal cortex, another descending in internal capsule. (6) In the internal capsule, the main bundle of descending degeneration occupying the retro-lenticular segment of the posterior limb on the side of the lesion. Its fibres were distributed in the first instance to the back part of the optic thalamus, the corpus geniculatum internum, and to both corpora quadrigemina. An additional set descended into the outer fifth of the pes pedunculi, reaching as low as the pons, where it terminated bilaterally. Other scattered degenerations were seen in the greater part of the posterior limbs of both capsules. These were traced into corresponding parts of the peduncles, and on into the pons. Fibres from this source were contributed to the optic thalami, the substantia nigra, and mesencephalic grey matter. (7) Lastly, in both fillets, crossing from the internal capsules, and gradually disappearing in the mid-brain.

II. *A law of bilateral association seems to prevail in the connexions established between a given area of cortex and other distantly situated masses of grey matter, whether subserving 'motor' or 'sensory' functions.*

N.B.—The expenses of this research have been defrayed by grants from the Royal Society and Royal Irish Academy.

XIII.

DIFFERENTIATION IN THE QUATERNION ANALYSIS.

BY ALEXANDER MACFARLANE, D.Sc., LL.D.

[COMMUNICATED BY MR. JOLY, ROYAL ASTRONOMER OF IRELAND.]

[Read JUNE 25, 1900.]

It is a prevalent belief in the learned world that the quaternion analysis has not taken that place among the methods of research which was predicted for it by its celebrated founder. Few mathematicians, excepting Professor Tait, have been able to bend the bow of Ulysses. Writers on the subject appear to share the opinion explicitly enunciated by Professor Hardy¹ that the writings of Hamilton contain the suggestion of all that will be done in the way of quaternion research and applications. The very greatness of the *Elements* appears to have had a deterring effect; for it has been considered a great storehouse of all the results that can be harvested in the quaternion field. It is commonly thought that the field is but a small corner of the mathematical domain, and that Hamilton has gone over it so thoroughly that there is little left to glean after him. However, there are good reasons for believing that the field is not narrow, but is, in all probability, nearly coextensive with the mathematical domain. My opinion is that Hamilton's estimate of the importance of the discovery which he communicated to this Academy at the memorable meeting of November, 1843, is under, instead of over the mark, and that this will be demonstrated by the course of development of mathematical analysis in the coming century.

But, first of all, the bow must be examined to find out why it is so difficult to bend. I do not suppose that Hamilton considered that he had arrived at a finality of wisdom on the principles of the analysis. He did not intend to give to the world a dead analysis, however classical. Anyhow, the analysis can receive only good from a free and independent discussion of its principles; if they are perfect, their perfection will thereby become the more apparent and convincing; if they are imperfect, it is certainly desirable that the imperfection

¹ In the preface to his *Elements of Quaternions*.

should be removed. There are two places in the *Elements of Quaternions* where further investigation seems desirable. The quaternion analysis is intended to be applicable to space of three dimensions, but at these two places Hamilton restricts the analysis to the plane.

The first place is in the treatment of logarithms. He says at page 386 :—

“In the present theory of diplanar quaternions we cannot expect to find that the sum of the logarithms of any two proposed factors shall be generally equal to the logarithm of the product ; but for the simpler and earlier case of complanar quaternions that algebraic property may be considered to exist with due modification for multiplicity of value.”

The other place is in the treatment of differentiation. He says at page 411 :—

“The functions of quaternions, which have been lately differentiated, may be said to be of algebraic form ; the following are a few examples of differentials of what may be called, by contrast, transcendental functions of quaternions ; the condition of complanarity being, however, here supposed to be satisfied, in order that the expressions may not become too complex.”

Space differentiation, as taught by Hamilton, certainly presents novel difficulties ; there is, in general, no differential coefficient ; recourse is made to a new definition of a differential, and under certain conditions only is there an analogue to Taylor's theorem. What is the source of these difficulties ? It is, according to Hamilton, the non-commutative character of quaternion multiplication. He says, at page 391 of the *Elements* :—

“The usual definitions of differential coefficients and of derived functions are found to be inapplicable generally to the present calculus, on account of the non-commutative character of quaternion multiplication. It becomes, therefore, necessary to have recourse to a new definition of differentiation, which yet ought to be so framed as to be consistent with, and to include, the usual rules of differentiation ; because scalars as well as vectors have been seen to be included under the general conception of Quaternions.”

The essence of the difficulty will be seen by taking the simple instance of the square. According to Hamilton,

$$(q + \Delta q)^2 = q^2 + q\Delta q + \Delta qq + (\Delta q)^2 ;$$

therefore $(q + \Delta q)^2 - q^2 = q\Delta q + \Delta qq + (\Delta q)^2,$

and $\{ (q + \Delta q)^2 - q^2 \} / \Delta q = q + \Delta qq / \Delta q + \Delta q ;$

hence, the limiting value when $\Delta q = 0$ is $q + 0q/0$ which is indefinite, because the second term is not independent of Δq ; consequently, there appears to be no differential coefficient. The new definition makes the differential of q^2 to be $q\Delta q + \Delta qq$; and this expression cannot be reduced to $2q\Delta q$, because the products $q\Delta q$ and Δqq are in general non-commutative.

It is evident that Hamilton's reasoning all depends on the truth of the rule according to which the square of a binomial is formed. He writes the square as two successive factors $(q + dq)(q + dq)$, applies the distributive rule, and preserves the order of the factors in the partial products. This is the reason why dq is posterior to q in one term and anterior in the other. But when dq is by nature posterior to q , as is the case when q denotes a logarithm, that cannot be the true rule for forming the square. No doubt a sum of arbitrary coordinate vectors is independent of order, but that is no good reason for assuming that an expression such as $q + dq$ is independent of order when it denotes an index.

The investigation of this question leads directly to a consideration of the other peculiarity mentioned above. According to Hamilton, $e^{q+q'} = e^q e^{q'}$ only when q and q' are coplanar; the general formula is $e^{q+q'} = e^q e^{q'} + \frac{qq' - q'q}{2} + \text{terms of the third and higher orders.}$ The term of the second order derived from $e^{q+q'}$ is $\frac{1}{2}(q + q')^2$, while that derived from $e^q e^{q'}$ is $\frac{1}{2}(q^2 + q'^2 + 2qq')$. Now, if

$$(q + q')^2 = q^2 + q'^2 + qq' + q'q,$$

we get the above difference of the second order; but if

$$(q + q')^2 = q^2 + q'^2 + 2qq',$$

there is no difference of the second order. Similarly, if

$$(q + q')^3 = q^3 + 3q^2q' + 3qq'^2 + q'^3,$$

there is no difference of the third order. And, generally, if the n^{th} power of $q + q'$ is formed after the formula for a binomial of scalar quantities, but subject to the condition that in each partial product q is always preserved anterior to q' , there will be no difference of the n^{th} order; and the exponential theorem generalised for space will retain the simple form which it has for the plane, namely,

$$e^{q+q'} = e^q e^{q'}.$$

If we look further into the matter, we shall find good reasons for believing that it must be so. Suppose that q and q' are Hamiltonian

vectors; they may then be denoted by β and γ . Now e^β is the expression for the circular versor, having the angle $T\beta$, and the axis $U\beta$; similarly e^γ is the expression for the circular versor, having the angle $T\gamma$, and the axis $U\gamma$. The product $e^\beta e^\gamma$ does not in general allow the order of the factors e^β and e^γ to be changed; consequently, if $e^{\beta+\gamma}$ is an equivalent expression, it cannot allow the order of the logarithms β and γ to be changed in $\beta + \gamma$. The sum of these logarithms is non-commutative, just as much as the factors of which they are the logarithms; and from this fact I conclude that the square or any power of $\beta + \gamma$ must be so formed that the order of β prior to γ is preserved.

There is another line of argument which proves very conclusively that in the expansion of $e^{\beta+\gamma}$ the powers must be expanded so as to preserve the order of the logarithms. It is known that $e^{-\beta} e^\gamma e^\beta$ expresses an angle, the magnitude of which is $T\gamma$, and the axis of which is $U\gamma$, turned by an angle of $2T\beta$ round $U\beta$. Now, according to the principle which I am advocating,

$$e^{-\beta} e^\gamma e^\beta = e^{-\beta+\gamma+\beta}.$$

Were the trinomial $-\beta + \gamma + \beta$ treated as a sum of vectors having no real order, it would reduce to γ , and e^γ is known not to be equivalent to $e^{-\beta} e^\gamma e^\beta$. But it is a remarkable fact that when the powers of $-\beta + \gamma + \beta$ are formed so as to preserve in the several partial products the natural order of the vectors, the terms of the series for the cosine are independent of γ , while those for the directed sine involve γ . This was shown at length in my paper on *The Fundamental Theorems of Analysis generalized for Space*.

Consider now the light which the generalized exponential theorem throws on the subject of differentiation. Let B denote a Hamiltonian vector, that is to say, the product of a tensor and a quadrantal versor. The tensor may be denoted by b . As a quadrantal versor is equivalent to an imaginary axis,¹ it may be denoted by $\sqrt{-1}\beta$. Hence $B = b\sqrt{-1}\beta$. First of all, what is the differential coefficient of e^B , supposing B to vary both in magnitude and axis. Suppose B to change into $B + dB$; then e^B becomes e^{B+dB} . By the generalized Exponential Theorem

$$\begin{aligned} e^{B+dB} &= e^B e^{dB} \\ &= e^B \left\{ 1 + dB + \frac{(dB)^2}{2!} + \frac{(dB)^3}{3!} + \dots \right\}; \end{aligned}$$

¹ "On Hyperbolic Quaternions," Proc. R.S.E., 16th July, 1900.

$$\text{therefore,} \quad e^{B+dB} - e^B = e^B \left\{ dB + \frac{(dB)^2}{2!} + \dots \right\},$$

$$\text{and} \quad \frac{e^{B+dB} - e^B}{dB} = e^B \left\{ 1 + \frac{dB}{2!} + \dots \right\},$$

$$\text{and} \quad L_{dB=0} \frac{(e^{B+dB} - e^B)}{dB} = e^B.$$

$$\text{Hence} \quad \frac{de^B}{dB} = e^B.$$

In form the differential coefficient does not differ from that for $\frac{d\phi}{db}$.

The next step is to find $\frac{dB^n}{dB}$ where B denotes a vector logarithm.

$$\text{Since} \quad e^B = 1 + B + \frac{B^2}{2!} + \dots + \frac{B^n}{n!} + \dots$$

$$\text{and} \quad de^B = e^B dB,$$

it follows that $dB^n = nB^{n-1}dB$. Hence, if B denote any vector logarithm, real or imaginary, and n a positive integer,

$$\frac{dB^n}{dB} = nB^{n-1}; \quad \text{and} \quad \frac{dB^n}{dt} = nB^{n-1} \frac{dB}{dt},$$

if t denote any scalar variable.

The above symbol B denotes a vector in the Hamiltonian sense; it is really an imaginary vector, and can be analysed into $b\sqrt{-1}\beta$, where b denotes the magnitude, and β the axis. Now

$$B^2 = (b\sqrt{-1}\beta)^2 = -b^2\beta^2;$$

and this expression reduces to $-b^2$ on the principle that $\beta^2 = 1$. According to Hamilton's assumption,

$$\frac{dB^2}{dt} = \frac{d(-b^2)}{dt} = -2b \frac{db}{dt};$$

but, according to the results of the above investigation,

$$\frac{dB^2}{dt} = 2B \frac{dB}{dt} = -2b\beta \frac{d(b\beta)}{dt};$$

and this reduces to $-2b \frac{db}{dt}$ only when β is constant. The above

results suppose β to be variable, and do not introduce the reduction $\beta^2 = 1$, at all events before differentiation; Hamilton's results suppose β to be constant, and introduce the reduction $\beta^2 = 1$.

The expression $e^{b\sqrt{-1}\beta}$ denotes the circular angle b in the plane which has the axis β . It merely makes definite the ordinary algebraic expression for a circular angle, namely $e^{b\sqrt{-1}}$.

Now $e^{b\sqrt{-1}} = \cos b + \sqrt{-1} \sin b$,
and corresponding to it

$$e^{b\sqrt{-1}\beta} = \cos b + \sqrt{-1} \sin b \beta.$$

In Hamilton's notation this is $Uq = SUq + VUq$. By differentiating the left-hand expression with respect to time, we obtain

$$\begin{aligned} \frac{d(e^{b\sqrt{-1}\beta})}{dt} &= e^{b\sqrt{-1}\beta} \frac{d(b\sqrt{-1}\beta)}{dt} \\ &= e^{b\sqrt{-1}\beta} \sqrt{-1} \left(\frac{db}{dt} \beta + b \frac{d\beta}{dt} \right). \end{aligned}$$

By differentiating the right-hand expression, we obtain

$$-\sin b \frac{db}{dt} + \sqrt{-1} \cos b \frac{db}{dt} \beta + \sqrt{-1} \sin b \frac{d\beta}{dt},$$

which cannot be reduced to the result obtained from the left-hand member, excepting under the condition that β is constant. The latter result is essentially unsymmetrical, and the reason for it is that the first term is supposed to be independent of β . As a matter of fact, $e^{b\sqrt{-1}\beta} = \cos b + \sqrt{-1} \sin b \beta$ is not a complete equivalence; the left-hand expression is a reduced form of the complete equivalence for $e^{b\sqrt{-1}\beta}$. As the reduction is effected by the principle that $\beta^2 = 1$, the differential coefficient obtained from the reduced expression can only be correct when β is constant. On the same principle, namely that β is constant,

$$\begin{aligned} \frac{dB^2}{dt} &= -\sqrt{-1} 3b^2 \frac{db}{dt} \beta^2 \\ &= -\sqrt{-1} 3b^2 \frac{db}{dt} \beta, \end{aligned}$$

and the quaternion analysis makes it so. Hence we have found out the true way of differentiating an integral power of a vector logarithm when both its magnitude and axis are variable.

The next step is to investigate the differential of a product of vector logarithms. On the one hand

$$\begin{aligned}
 d e^{A+B} &= e^{A+B} d(A+B) \\
 &= \left\{ 1 + A + B + \frac{(A+B)^2}{2!} + \dots \right\} d(A+B) \\
 &= dA + dB \\
 &\quad + \{AdA + AdB + BdA + BdB\} \\
 &\quad + \frac{1}{2!} \{A^2dA + A^2dB + 2ABdA + 2ABdB + B^2dA + B^2dB\} \\
 &\quad + \&c.
 \end{aligned}$$

On the other hand

$$\begin{aligned}
 e^A e^B &= \left(1 + A + \frac{A^2}{2!} + \dots \right) \left(1 + B + \frac{B^2}{2!} + \dots \right) \\
 &= 1 + A + B \\
 &\quad + \left\{ \frac{A^2}{2!} + AB + \frac{B^2}{2!} \right\} \\
 &\quad + \left\{ \frac{A^3}{3!} + \frac{A^2B}{2!} + \frac{AB^2}{2!} + \frac{B^3}{3!} \right\} \\
 &\quad + \&c. ;
 \end{aligned}$$

therefore

$$\begin{aligned}
 d(e^A e^B) &= dA + dB \\
 &\quad + \{AdA + d(AB) + BdB\} \\
 &\quad + \frac{1}{2!} \{A^2dA + d(A^2B) + d(AB^2) + B^2dB\} \\
 &\quad + \&c.
 \end{aligned}$$

Hence, by comparison of the two results,

$$\begin{aligned}
 d(AB) &= AdB + BdA, \\
 d(A^2B) &= 2ABdA + A^2dB, \\
 d(AB^2) &= B^2dA + 2ABdB.
 \end{aligned}$$

The factors are not differentiated *in situ*, as is done by Hamilton and Tait in the case of the products of ordinary vectors; on the contrary, the differential is always written at the end, for the natural order of the logarithms is A, B, dA, dB .

This principle enables us to differentiate the reciprocal of a vector logarithm. The expression B/B is equal to 1 absolutely; by which I mean, that it reduces by means of the principle that $\beta/\beta = 1$, not by means of $\beta^2 = 1$. As the correct place for the differential is at the end

$$d(B/B) = /BdB + Bd(/B) = 0;$$

therefore

$$d(/B) = -/B^2dB;$$

that is

$$d \frac{1}{B} = -\frac{1}{B^2} dB.$$

We may infer that generally

$$d(B^{-n})/dB = -nB^{-(n+1)}.$$

Let A/B denote any quotient of vector logarithms,

$$d(A/B) = /BdA - A/B^2dB.$$

We observe that the solidus symbol for *reciprocal* is more suitable than the horizontal stroke, because $/B \cdot A$ and A/B involve order and are not equivalent to one another. The slant stroke expresses the difference, whereas the horizontal stroke does not.

Consider now the differentiation of transcendental functions of vectors in which Hamilton found an obstacle. Let B denote a vector, real or imaginary, which may vary both in magnitude and axis. The *cosh* function is the more general function, that is to say, it includes the *cos* function as a special case. Now

$$\cosh B = 1 + \frac{B^2}{2!} + \frac{B^4}{4!} + \text{etc.}$$

$$d(\cosh B) = (B + \frac{B^3}{3!} + \frac{B^5}{5!} + \dots)dB;$$

therefore

$$d(\cosh B)/dB = \sinh B.$$

Similarly

$$d(\sinh B)/dB = \cosh B.$$

When B is imaginary, it may be written $\sqrt{-1} B_0$, and

$$\cos B_0 = 1 - \frac{B_0^2}{2!} + \frac{B_0^4}{4!} - \text{etc.}$$

$$d(\cos B_0) = \left\{ -B_0 + \frac{B_0^3}{3!} - \text{etc.} \right\} dB_0,$$

therefore

$$d(\cos B_0)/dB_0 = -\sin B_0.$$

In a similar manner it may be shown that

$$d \log B = \frac{1}{B} dB.$$

The generalisation of Taylor's Theorem for such vectors is now evident. Let X and Y denote any two vector logarithms, real or imaginary; then

$$f(X + Y) = f(X) + f'(X) Y + \frac{1}{2!} f''(X) Y^2 + \text{etc.},$$

provided that the order of X prior to Y is preserved throughout. And, in general, such vector differentiation differs from the common differentiation in preserving the real order of the vector symbols.

Let R denote a variable vector of the kind which we have been denoting by B . Then $R = r\rho$, where r is the modulus, and ρ the axis.

$$dR = dr \cdot \rho + r d\rho,$$

and

$$d^2 R = d^2 r \cdot \rho + 2 dr d\rho + r d^2 \rho.$$

Suppose that the vector is circular (or imaginary), then

$$\rho = \sqrt{-1} \{ \cos \theta \cdot i + \sin \theta (\cos \phi \cdot j + \sin \phi \cdot k) \},$$

where i, j, k are constant real axes. Then

$$d\rho = \frac{\partial \rho}{\partial \theta} d\theta + \frac{\partial \rho}{\partial \phi} d\phi,$$

$$d^2 \rho = \frac{\partial^2 \rho}{\partial \theta^2} (d\theta)^2 + \frac{\partial \rho}{\partial \theta} d^2 \theta + \frac{\partial^2 \rho}{\partial \phi^2} (d\phi)^2 + \frac{\partial \rho}{\partial \phi} d^2 \phi.$$

Hence,

$$dR = dr\rho + r d\theta \frac{\partial \rho}{\partial \theta} + r d\phi \frac{\partial \rho}{\partial \phi},$$

$$\begin{aligned} d^2 R = d^2 r \cdot \rho + (2 dr d\theta + r d^2 \theta) \frac{\partial \rho}{\partial \theta} + (2 dr d\phi + r d^2 \phi) \frac{\partial \rho}{\partial \phi} + r (d\theta)^2 \frac{\partial^2 \rho}{\partial \theta^2} \\ + r (d\phi)^2 \frac{\partial^2 \rho}{\partial \phi^2} + 2 r d\theta d\phi \frac{\partial^2 \rho}{\partial \theta \partial \phi}. \end{aligned}$$

Now

$$\frac{\partial^2 \rho}{\partial \theta^2} = -\rho,$$

and

$$\frac{\partial^2 \rho}{\partial \phi^2} = -\sin^2 \theta \cdot \rho - \sin \theta \cos \theta \cdot \frac{\partial \rho}{\partial \theta},$$

and

$$\frac{\partial^2 \rho}{\partial \theta \partial \phi} = \cot \theta \frac{\partial \rho}{\partial \phi};$$

$$\begin{aligned} \text{therefore} \quad d^2 R &= \{d^2 r - r(d\theta)^2 - r(\sin \theta d\phi)^2\} \rho \\ &+ \{2dr d\theta + r d^2 \theta - r \sin \theta \cos \theta (d\phi)^2\} \frac{\partial \rho}{\partial \theta} \\ &+ (2dr d\phi + r d^2 \phi + 2rd\theta d\phi \cot \theta) \frac{\partial \rho}{\partial \phi}. \end{aligned}$$

Here R does not denote a radius vector merely; it denotes any circular vector whatever. The ordinary direct process of deducing these components is very long and cumbrous. See Price's *Infinitesimal Calculus*, vol. III., p. 433.

Consider now that important and mysterious operation peculiar to the calculus of Quaternions which is denoted by ∇ . The original definition of this symbol, as given by Hamilton, is purely symbolic; namely,

$$\nabla = i \frac{\partial}{\partial x} + j \frac{\partial}{\partial y} + k \frac{\partial}{\partial z}.$$

Here the i, j, k are written in the numerator, and before their respective differential operators; why should they not be written after the operator, and in the denominator? As they form a kind of differential operator, it is natural to suppose that they should appear in the denominator, in order that the homogeneousness of the dimensions of the expressions may be preserved. In fact, if u denote a scalar function, ∇u is said to be the rate of change of u per unit of length in the direction of the most rapid change; from which it may be inferred that the axis naturally appears in the denominator. The i is written to the left of the $\frac{\partial}{\partial x}$, probably because Hamilton chose for the standard order that from right to left; where the natural order of writing is followed, the i ought to be written to the right of the $\frac{\partial}{\partial x}$.

The following may be taken as a preliminary definition. By the nabla (∇) of a function of several variables is meant the sum of the partial derivatives, each multiplied by the nabla of its variable. Let R denote a Hamiltonian vector, having a magnitude r and an imaginary axis ρ equivalent to $\sqrt{-1} \rho_0$. For any function of r and ρ ,

$$\nabla = \frac{\partial(\quad)^*}{\partial r} \nabla r + \frac{\partial(\quad)}{\partial \rho} \nabla \rho.$$

Apply it to R itself

$$\begin{aligned} \nabla R &= \frac{\partial(r\rho)}{\partial r} \nabla r + \frac{\partial(r\rho)}{\partial \rho} \nabla \rho \\ &= \rho \nabla r + r \nabla \rho. \end{aligned}$$

* () indicates the place for the function.

The problem is reduced to finding the value of ∇r and of $\nabla \rho$. When ρ is constant, $\nabla R = \rho \nabla r$. According to Hamilton and Tait $\nabla r = \rho$; hence, for the case of ρ being constant $\nabla R = \rho^2$, which has the reduced value of -1 . But if we take $\nabla r = \frac{1}{\rho}$, in the case of ρ being constant, ∇R will be $\rho/\rho = 1$ absolutely, that is, independent of the principle that $\rho^2 = -1$, and of the condition that ρ involves the $\sqrt{-1}$. As $xi + yj + zk$ is the sum of three such vectors with constant axes,

$$\nabla (xi + yj + zk) = \left(\frac{\partial(xi)}{\partial x} \frac{1}{i} + \frac{\partial(yj)}{\partial y} \frac{1}{j} + \frac{\partial(zk)}{\partial z} \frac{1}{k} \right) = 3.$$

Consider next the general case when both r and ρ are variable.

We have $\nabla(r\rho) = 1 + r\nabla\rho$.

As one term of this equation is an absolute number, I infer that the other two terms are absolute numbers. There is reason to believe that $\nabla(r\rho) = 3$; which makes $\nabla\rho = \frac{2}{r}$. According to Tait, $\nabla\rho = -\frac{2}{r}$, and $\nabla(r\rho) = -3$.

Let $\rho \frac{1}{\rho} = 1$ be differentiated *in situ*, that is, as an ordinary product of vectors;

$$d\rho \frac{1}{\rho} + \rho d\left(\frac{1}{\rho}\right) = 0,$$

$$\text{therefore} \quad d\left(\frac{1}{\rho}\right) = -\frac{1}{\rho} d\rho \frac{1}{\rho} = \frac{1}{\rho^2} d\rho,$$

because ρ and $d\rho$ are at right angles.

$$\text{Hence} \quad d\left(\frac{1}{\rho}\right)/d\rho = \frac{1}{\rho^2}.$$

In what follows, I propose to apply the above principles, viz. that

$$d\left(\frac{1}{\rho}\right)/d\rho = \frac{1}{\rho^2}, \quad \nabla r = \frac{1}{\rho}, \quad \text{and} \quad \nabla\rho = \frac{2}{r}.$$

First apply them to find $\nabla^2 \frac{1}{r}$ which is known to be 0,

$$\begin{aligned} \nabla \frac{1}{r} &= -\frac{1}{r^2} \nabla r = \left(-\frac{1}{r^2}\right) \left(\frac{1}{\rho}\right) = -\frac{1}{r^2 \rho}, \\ \nabla^2 \frac{1}{r} &= \nabla - \frac{1}{r^2 \rho} = \frac{2}{r^2} \left(\frac{1}{\rho}\right) \frac{1}{\rho} - \frac{1}{r^2} \left(\frac{1}{\rho^2}\right) \frac{2}{r}, \\ &= \frac{2}{r^2 \rho^2} - \frac{2}{r^3 \rho^2} = 0. \end{aligned}$$

Next apply them to find $\nabla^2 r^m$,

$$\begin{aligned}\nabla^2 r^m &= m r^{m-1} \frac{1}{r}, \\ \nabla^2 r^m &= m(m-1) r^{m-2} \frac{1}{r^2} + 2m r^{m-1} \left(\frac{1}{r^2} \right) \frac{2}{r}, \\ &= m(m-1) r^{m-2} \frac{1}{r^2} + 2m r^{m-2} \frac{1}{r^2}, \\ &= m(m+1) r^{m-2} \frac{1}{r^2},\end{aligned}$$

which is the correct result.

For any function of r and ρ , whether scalar or vector,

$$\begin{aligned}\nabla &= \frac{\partial(\)}{\partial r} \nabla r + \frac{\partial(\)}{\partial \rho} \nabla \rho, \\ &= \frac{\partial(\)}{\partial r} \frac{1}{r} + \frac{\partial(\)}{\partial \rho} \frac{2}{r}.\end{aligned}$$

Hence for any such function,

$$\begin{aligned}\nabla^2 &= \left(\frac{\partial}{\partial r} \frac{1}{r} + \frac{\partial}{\partial \rho} \frac{2}{r} \right) \left(\frac{\partial}{\partial r} \frac{1}{r} + \frac{\partial}{\partial \rho} \frac{2}{r} \right) \\ &= \frac{\partial}{\partial r} \left(\frac{\partial(\)}{\partial r} \frac{1}{r} \right) \frac{1}{r}^{(1)} + \frac{\partial}{\partial \rho} \left(\frac{\partial(\)}{\partial \rho} \frac{2}{r} \right) \frac{2}{r}^{(2)} \\ &\quad + \frac{\partial}{\partial r} \left(\frac{\partial(\)}{\partial \rho} \frac{2}{r} \right) \frac{1}{r}^{(3)} + \frac{\partial}{\partial \rho} \left(\frac{\partial(\)}{\partial r} \frac{1}{r} \right) \frac{2}{r}^{(4)} \\ &= \frac{\partial^2(\)}{\partial r^2} \frac{1}{r^3}^{(1)} + \frac{\partial^2(\)}{\partial \rho^2} \frac{4}{r^3}^{(2)} \\ &\quad + \frac{\partial^2(\)}{\partial r \partial \rho} \frac{2}{r^2 \rho}^{(3)} - \frac{\partial(\)}{\partial \rho} \frac{2}{r^2 \rho}^{(4)} \\ &\quad + \frac{\partial^2(\)}{\partial \rho \partial r} \frac{2}{\rho r}^{(5)} + \frac{\partial(\)}{\partial r} \frac{2}{\rho^2 r}^{(6)}.\end{aligned}$$

If the function is a function of r only, all the terms involving $\frac{\partial}{\partial \rho}$ vanish, and ∇^2 becomes

$$\frac{\partial^2(\)}{\partial r^2} \frac{1}{r^3} + \frac{\partial(\)}{\partial r} \frac{2}{\rho^2 r}.$$

If we introduce, in the result, the reduction $\rho^3 = -1$, then

$$\nabla^3 = -\frac{\partial^2(\)}{\partial r^3} - \frac{2}{r} \frac{\partial(\)}{\partial r},$$

which agrees with the well known result, excepting that it introduces the negative sign. The remaining terms are

$$\frac{\partial^2(\)}{\partial \rho^3} \frac{4}{r^3} + \frac{\partial^2(\)}{\partial r \partial \rho} \frac{4}{r \rho} - \frac{\partial(\)}{\partial \rho} \frac{2}{r^2 \rho},$$

which exist when the function involves ρ , and which are, in general, vector in nature.

I shall next apply the above principles of differentiation to find ∇ and ∇^2 for any function expressed in terms of the spherical coordinates r, θ, ϕ . According to the definition adopted, by the nabla of a function is meant the sum of the several derivatives of the function each multiplied by the nabla of its variable. Hence for a function of r, θ, ϕ ,

$$\nabla = \frac{\partial(\)}{\partial r} \nabla r + \frac{\partial(\)}{\partial \theta} \nabla \theta + \frac{\partial(\)}{\partial \phi} \nabla \phi.$$

Apply this operator to the function $r\rho$, in which case we know that the nabla of the function is 3. We have

$$\nabla(r\rho) = \rho \nabla r + r \frac{\partial \rho}{\partial \theta} \nabla \theta + r \frac{\partial \rho}{\partial \phi} \nabla \phi = 3.$$

We know that $\rho \nabla r = 1$; hence

$$r \frac{\partial \rho}{\partial \theta} \nabla \theta + r \frac{\partial \rho}{\partial \phi} \nabla \phi = 2,$$

from which I infer that

$$\nabla \theta = \frac{1}{r \frac{\partial \rho}{\partial \theta}} \quad \text{and} \quad \nabla \phi = \frac{1}{r \frac{\partial \rho}{\partial \phi}};$$

wherefore

$$\nabla = \frac{\partial(\)}{\partial r} \frac{1}{\rho} + \frac{\partial(\)}{\partial \theta} \frac{1}{r \frac{\partial \rho}{\partial \theta}} + \frac{\partial(\)}{\partial \phi} \frac{1}{r \frac{\partial \rho}{\partial \phi}}$$

As $\rho = \sqrt{-1} \{ \cos \theta . i + \sin \theta (\cos \phi . j + \sin \phi . k) \};$

$$\frac{\partial \rho}{\partial \theta} = \sqrt{-1} \{ -\sin \theta . i + \cos \theta (\cos \phi . j + \sin \phi . k) \},$$

and $\frac{\partial \rho}{\partial \phi} = \sqrt{-1} \sin \theta \{ -\sin \phi . j + \cos \phi . k \}.$

For instance, let the function be $\cos \theta$. Then

$$\begin{aligned} \nabla \cos \theta &= \frac{d \cos \theta}{d \theta} \frac{1}{r \frac{d \rho}{d \theta}} \\ &= -\frac{\sin \theta}{r} \frac{1}{\sqrt{-1} \{ -\sin \theta . i + \cos \theta (\cos \phi . j + \sin \phi . k) \}}. \end{aligned}$$

The expression for the square of nabla is deduced by the direct process of multiplying together two nablas, preserving everywhere the order of the operations. Thus

$$\begin{aligned} \nabla^2 &= \left\{ \frac{\partial}{\partial r} \frac{1}{\rho} + \frac{\partial}{\partial \theta} \frac{1}{r \frac{\partial \rho}{\partial \theta}} + \frac{\partial}{\partial \phi} \frac{1}{r \frac{\partial \rho}{\partial \phi}} \right\} \left\{ \frac{\partial}{\partial r} \frac{1}{\rho} + \frac{\partial}{\partial \theta} \frac{1}{r \frac{\partial \rho}{\partial \theta}} + \frac{\partial}{\partial \phi} \frac{1}{r \frac{\partial \rho}{\partial \phi}} \right\} \\ &= \frac{\partial^2 ()}{\partial r^2} \frac{1}{\rho^2} + \frac{\partial}{\partial \theta} \left(\frac{\partial ()}{\partial \theta} \frac{1}{r \frac{\partial \rho}{\partial \theta}} \right) \frac{1}{r \frac{\partial \rho}{\partial \theta}} + \frac{\partial}{\partial \phi} \left(\frac{\partial ()}{\partial \phi} \frac{1}{r \frac{\partial \rho}{\partial \phi}} \right) \frac{1}{r \frac{\partial \rho}{\partial \phi}} \\ &\quad + \frac{\partial}{\partial r} \left(\frac{\partial ()}{\partial \theta} \frac{1}{r \frac{\partial \rho}{\partial \theta}} \right) \frac{1}{\rho} + \frac{\partial}{\partial r} \left(\frac{\partial ()}{\partial \phi} \frac{1}{r \frac{\partial \rho}{\partial \phi}} \right) \frac{1}{\rho} \\ &\quad + \frac{\partial}{\partial \theta} \left(\frac{\partial ()}{\partial r} \frac{1}{\rho} \right) \frac{1}{r \frac{\partial \rho}{\partial \theta}} + \frac{\partial}{\partial \theta} \left(\frac{\partial ()}{\partial \phi} \frac{1}{r \frac{\partial \rho}{\partial \phi}} \right) \frac{1}{r \frac{\partial \rho}{\partial \theta}} \\ &\quad + \frac{\partial}{\partial \phi} \left(\frac{\partial ()}{\partial r} \frac{1}{\rho} \right) \frac{1}{r \frac{\partial \rho}{\partial \phi}} + \frac{\partial}{\partial \phi} \left(\frac{\partial ()}{\partial \theta} \frac{1}{r \frac{\partial \rho}{\partial \theta}} \right) \frac{1}{r \frac{\partial \rho}{\partial \phi}}. \end{aligned}$$

When the terms subsequent to the first are expanded by means of the principle of differentiation by parts, we obtain

$$\begin{aligned}
 \nabla^2 &= \frac{\partial^2(\)}{\partial r^2} \frac{1}{\rho^2} \\
 &+ \frac{1}{r^2} \frac{\partial^2(\)}{\partial \theta^2} \frac{1}{\left(\frac{\partial \rho}{\partial \theta}\right)^2} + \frac{1}{r^2} \frac{\partial(\)}{\partial \theta} \frac{1}{\left(\frac{\partial \rho}{\partial \theta}\right)^2} \frac{\partial^2 \rho}{\partial \theta^2} \frac{1}{\frac{\partial \rho}{\partial \theta}} \\
 &+ \frac{1}{r^2} \frac{\partial^2(\)}{\partial \phi^2} \frac{1}{\left(\frac{\partial \rho}{\partial \phi}\right)^2} + \frac{1}{r^2} \frac{\partial(\)}{\partial \phi} \frac{1}{\left(\frac{\partial \rho}{\partial \phi}\right)^2} \frac{\partial^2 \rho}{\partial \phi^2} \frac{1}{\frac{\partial \rho}{\partial \phi}} \\
 &+ \frac{1}{r} \frac{\partial^2(\)}{\partial r \partial \theta} \frac{1}{\frac{\partial \rho}{\partial \theta} \rho} - \frac{1}{r^2} \frac{\partial(\)}{\partial \theta} \frac{1}{\frac{\partial \rho}{\partial \theta} \rho} \\
 &+ \frac{1}{r} \frac{\partial^2(\)}{\partial r \partial \phi} \frac{1}{\frac{\partial \rho}{\partial \phi} \rho} - \frac{1}{r^2} \frac{\partial(\)}{\partial \phi} \frac{1}{\frac{\partial \rho}{\partial \phi} \rho} \\
 &+ \frac{1}{r} \frac{\partial^2(\)}{\partial \theta \partial r} \frac{1}{\rho \frac{\partial \rho}{\partial \theta}} + \frac{1}{r} \frac{\partial(\)}{\partial r} \frac{1}{\rho^2} \frac{\partial \rho}{\partial \theta} \frac{1}{\frac{\partial \rho}{\partial \theta}} \\
 &+ \frac{1}{r^2} \frac{\partial^2(\)}{\partial \theta \partial \phi} \frac{1}{\frac{\partial \rho}{\partial \phi} \frac{\partial \rho}{\partial \theta}} + \frac{1}{r^2} \frac{\partial(\)}{\partial \phi} \frac{1}{\left(\frac{\partial \rho}{\partial \phi}\right)^2} \frac{\partial^2 \rho}{\partial \theta \partial \phi} \frac{1}{\frac{\partial \rho}{\partial \theta}} \\
 &+ \frac{1}{r} \frac{\partial^2(\)}{\partial \phi \partial r} \frac{1}{\rho \frac{\partial \rho}{\partial \phi}} + \frac{1}{r} \frac{\partial(\)}{\partial r} \frac{1}{\rho^2} \frac{\partial \rho}{\partial \phi} \frac{1}{\frac{\partial \rho}{\partial \phi}} \\
 &+ \frac{1}{r^2} \frac{\partial^2(\)}{\partial \phi \partial \theta} \frac{1}{\frac{\partial \rho}{\partial \theta} \frac{\partial \rho}{\partial \phi}} + \frac{1}{r^2} \frac{\partial(\)}{\partial \theta} \frac{1}{\left(\frac{\partial \rho}{\partial \theta}\right)^2} \frac{\partial^2 \rho}{\partial \phi \partial \theta} \frac{1}{\frac{\partial \rho}{\partial \phi}} .
 \end{aligned}$$

When these terms are collected according to the differential operator, we obtain

$$\begin{aligned}
 \nabla^2 = & \frac{\partial^2(\)}{\partial r^2} \frac{1}{\rho^2} + \frac{1}{r^2} \frac{\partial(\)}{\partial \theta^2} \frac{1}{\left(\frac{\partial \rho}{\partial \theta}\right)^2} + \frac{1}{r^2} \frac{\partial^2(\)}{\partial \phi^2} \frac{1}{\left(\frac{\partial \rho}{\partial \phi}\right)^2} \\
 & + \frac{1}{r} \frac{\partial^2(\)}{\partial r \partial \theta} \left\{ \frac{1}{\frac{\partial \rho}{\partial \theta} \rho} + \frac{1}{\rho \frac{\partial \rho}{\partial \theta}} \right\}^{(4)} \\
 & + \frac{1}{r} \frac{\partial^2(\)}{\partial r \partial \phi} \left\{ \frac{1}{\frac{\partial \rho}{\partial \phi} \rho} + \frac{1}{\rho \frac{\partial \rho}{\partial \phi}} \right\}^{(5)} \\
 & + \frac{1}{r^2} \frac{\partial^2(\)}{\partial \theta \partial \phi} \left\{ \frac{1}{\frac{\partial \rho}{\partial \phi} \frac{\partial \rho}{\partial \theta}} + \frac{1}{\frac{\partial \rho}{\partial \theta} \frac{\partial \rho}{\partial \phi}} \right\}^{(6)} \\
 & + \frac{1}{r} \frac{\partial(\)}{\partial r} \left\{ \frac{1}{\rho^2} + \frac{1}{\rho^3} \right\}^{(7)} \\
 & + \frac{1}{r^2} \frac{\partial(\)}{\partial \theta} \left\{ + \frac{1}{\left(\frac{\partial \rho}{\partial \theta}\right)^2} \frac{\partial^2 \rho}{\partial \theta^2} \frac{1}{\frac{\partial \rho}{\partial \theta}} - \frac{1}{\frac{\partial \rho}{\partial \theta} \rho} + \frac{1}{\left(\frac{\partial \rho}{\partial \theta}\right)^2} \frac{\partial^2 \rho}{\partial \phi \partial \theta} \frac{1}{\frac{\partial \rho}{\partial \phi}} \right\}^{(8)} \\
 & + \frac{1}{r^2} \frac{\partial(\)}{\partial \phi} \left\{ + \frac{1}{\left(\frac{\partial \rho}{\partial \phi}\right)^2} \frac{\partial^2 \rho}{\partial \phi^2} \frac{1}{\frac{\partial \rho}{\partial \phi}} - \frac{1}{\frac{\partial \rho}{\partial \phi} \rho} + \frac{1}{\left(\frac{\partial \rho}{\partial \phi}\right)^2} \frac{\partial^2 \rho}{\partial \theta \partial \phi} \frac{1}{\frac{\partial \rho}{\partial \theta}} \right\}^{(9)}.
 \end{aligned}$$

Since ρ^2 reduces to -1 , $\left(\frac{\partial \rho}{\partial \theta}\right)^2$ to -1 , and $\left(\frac{\partial \rho}{\partial \phi}\right)^2$ to $-\sin^2 \theta$, the first three terms reduce to

$$- \left(\frac{\partial^2}{\partial r^2} + \frac{1}{r^2} \frac{\partial^2}{\partial \theta^2} + \frac{1}{(r \sin \theta)^2} \frac{\partial^2}{\partial \phi^2} \right).$$

By the same principles of reduction, the space-coefficient of (4) reduce to

$$\frac{\partial \rho}{\partial \theta} \rho + \rho \frac{\partial \rho}{\partial \theta},$$

which reduces to 0, because ρ and $\frac{\partial \rho}{\partial \theta}$ are at right angles. For similar reasons the coefficients of (5) and of (6) reduce to 0. There remain the terms in $\frac{\partial}{\partial r}$, $\frac{\partial}{\partial \theta}$, and $\frac{\partial}{\partial \phi}$.

The term in $\frac{\partial}{\partial r}$ reduces to $-\frac{2}{r} \frac{\partial}{\partial r}$. As $\frac{\partial^2 \rho}{\partial \theta^2} = -\rho$, and $\left(\frac{\partial \rho}{\partial \theta}\right)^2$ reduces to $-\rho$, the first two terms in the coefficient of (8) reduce to $\rho \frac{\partial \rho}{\partial \theta} + \frac{\partial \rho}{\partial \theta} \rho$ which reduces to 0. The third term reduces to

$$-\frac{\partial^2 \rho}{\partial \phi \partial \theta} \frac{1}{\frac{\partial \rho}{\partial \phi}},$$

which is equal to

$$-\frac{\cos \theta (-\sin \phi \cdot j + \cos \phi \cdot k)}{\sin \theta (-\sin \phi \cdot j + \cos \phi \cdot k)},$$

that is, $-\cotan \theta$.

The first term of the space-coefficient of the term in $\frac{\partial}{\partial \phi}$ reduces to $-\frac{1}{\sin^2 \theta} i$; the second to $-\frac{\sin \theta \partial \rho_0}{\sin^2 \theta \partial \theta}$; the third to $\frac{\cos \theta}{\sin^2 \theta} \rho_0$. Hence the term is

$$-\frac{1}{r^2 \sin^2 \theta} \frac{\partial ()}{\partial \phi} \left\{ i + \sin \theta \cdot \frac{\partial \rho_0}{\partial \theta} - \cos \theta \cdot \rho_0 \right\}$$

$$= \frac{1}{r^2 \sin^2 \theta} \frac{\partial ()}{\partial \phi} \times 0.$$

Laplace's operator in polar coordinates is

$$\frac{\partial^2}{\partial r^2} + \frac{1}{r^2} \frac{\partial^2}{\partial \theta^2} + \frac{1}{(r \sin \theta)^2} \frac{\partial^2}{\partial \phi^2} + \frac{2}{r} \frac{\partial}{\partial r} + \frac{1}{r^2} \cot \theta \frac{\partial}{\partial \theta};$$

and the above reduced operator is the precise negative of Laplace's operator.

* By ρ_0 is meant ρ without the $\sqrt{-1}$.

XIV.

PRIMATE USSHER'S LIBRARY BEFORE 1641. BY HUGH JACKSON LAWLOR, D.D.

[Read JUNE 11, 1900.]

IN the Ussher collection in the Bodleian Library, at Oxford, there is a common-place book (marked Add. C. 299), which, in the year 1598, belonged to one T. Metcalf, who was then, as he tells us, in the twenty-eighth year of his age. Metcalf's notes do not appear to be of any interest or value. I spent some time in attempting to read one of them, under the mistaken impression that it gave a description of the contents of a book. It is headed "De Amore." I abandoned the task of deciphering it when I had advanced far enough to learn that, in the writer's opinion, the Greek equivalent of "amor" is "ereos." Nor was I tempted to investigate any of his other essays.

These notes occupy only a small portion of the volume, and they were separated by large spaces of blank paper, which have been utilized by subsequent scribes in an interesting way. They contain four library lists. Of these, three are dated, and their purpose is manifest. All four may now be printed. In the notes I have added the press-marks of volumes now in the Library of Trinity College, answering to the descriptions given in the lists, and, where it seemed desirable, their full titles. I have not indicated volumes which have inscribed in them the names of former owners such as Gilbert, Palliser, and Worth, whose collections are known to have been formed long after the date of the most recent of our lists, and to whom it is scarcely possible that any of the volumes enumerated can have belonged. Where for various reasons I have thought it not probable that the volume mentioned in the note is identical with that described in the text, its press-mark has been enclosed within brackets. Some words and numerals in the lists have been struck out. These are printed in italic type. Illegible letters are indicated by dots enclosed in square brackets.

First List.—f. iii v.

- | | | |
|--------------------------------|--------------------------|---------------------------|
| A 1—[1]2 \| Supra 10. | F 1—16. | L 1—21 Supra 17. |
| 2—13 \| Supra 4 \| A latere 4. | 2—15 Supra 2. | 2—23 Supra 5. |
| 3—[1]9 \| Supra 9 \| A latere 1. | 3—19 Supra 3. | 3—17 Supra 2. |
| 4—13 \| Supra 2. A latere 8. | 4—27 Supra 3. | |
| 5—16 \| Supra 13 \| | 5—29 Supra 2. | |
| 6— \| 22 \| Supra 6. | 6—25. | M 1—30. |
| | | 2—24 Supra 4. |
| | | 3. |
| B 1— \| 11 \| Supra 1 \| | G 1—23 Supra 4. | |
| 2— \| 11 \| | 2—22. | |
| 3— \| 11 \| | 3—6. | N 1—32. |
| 4— \| 12 \| | 4—21. | 2—33 Supra 4. |
| 5— \| 12 Supra 2 \| | 5—26. | 3. |
| 6—16(?) Supra 2. | 6—16. | |
| C 1— \| 14 \| Supra 1. | | O 1—\|34\| Supra \|11\| |
| 2—17 Supra 1. | | 2—30 Supra 4(?). |
| 3—9. | H 1—10. | 3—29 Supra 1. |
| 4—20 Supra 2. | 2—29. | 4. |
| 5—17 Supra 1. | 3—7(?). | |
| 6— \| 18 \| | 4. | P 1—29. |
| | 5— \| 10 \| | 2—43 Supra 4. |
| D 1—17 \| Supra 2. | 6. | 3—26. |
| 2—22 Supra 5. | | 4—13. |
| 3—13. | | |
| 4—19 Supra 7. | J 1—\|10\| Supra 1. | |
| 5— \| 15 \| | 2—17 Supra 6. | Q 1—20. |
| 6— \| 22 \| Supra 6. | 3—12 Supra 5. | 2—26. |
| | 4—Libri variorum | 3. |
| | Generum. | 4—16. |
| E 1—18 Supra 2. | | R 1. |
| 2—14 Supra 2. | | 2. |
| 3— \| 10 \| | K 1—16 Supra 4. | 3. |
| 4—28. | 2— \| 14 \| | 4—20. |
| 5. | 3—8. | |
| 6—6. | | |

Second List.¹—f. 8 v.

Wanting († of old.)

Recensio librorum facta, Febr. 20. 1635.² (desin.)A. 1. — 3. *Cyrrilli Alexandrini Opera, Latine. Paris. 1572. fol.*³B. 3.—10. *Cypriani opera cum Pamelij notis. 1593. fol.*⁴†14. *Kemnitij Examen Concilij Tridentini. Francof. 1574. fol.*
(M^r Puttock.)⁵5.—†8. *Scoti à Cauelo editi volumen 1^{um} fol.*⁶ } M^r Nugent⁷
9. *Ejusdem volumen 2^{um}*6.—†6. *Petri Suavis Historia Concilij Tridentini. | 1620. fol.*⁸C. 1. — 3. *Johannis Hussi Operum tomus 1^{us} | fol.*3.—†14. *Operum Spalatensis tomus 1^{us} | fol.*⁹ (M^r Nugent.)¹ This list is in Ussher's hand.² New style, 1636.³ BB. ff. 26 (two vols. in one).⁴ BB. ff. 1 (C. aa. 30).⁵ One of Ussher's assistants in the controversy with Malone. He put forth *A Reioynder unto William Malone's reply to the First Article . . .* by Roger Puttocke, Minister of the Gospel at Navan. Dublin, 1632. In spite of this modest description of his office, he was at the time Rector of Dunmowe and Kilmoone, Vicar of Donaghmore, and Curate of Navan and Clonmacduffe, to which a year later he added the Curacy of Kentstown, all in Ussher's Diocese of Meath! See *Vis. Reg.* 1633, Reeves' transcript, p. 63 sq. (T.C.D., MS. 1067).⁶ CC. d. 34 (Colonie Agrippinæ, 1635). Cavellus is the Latinized equivalent of MacCaghwell, titular Archbishop of Armagh.⁷ This may be Walter Nugent, a letter from whom to Ussher is given in Ussher's *Works*, xvi., 508, or his son James Nugent, mentioned below, p. 222.⁸ DD. c. 18. The Latin translation, by Bishop Bedell and Adam Newton, of the *Istoria del Concilio Tridentino* of Fra Paolo Sarpi, whose pseudonym is Pietro Soave Polano. This work was published at London, in 1619, by Antonio de Dominis, Archbishop of Spalato; the translation in the following year, also at London. See Wharton Jones, *Life of Bedell* (Camden Society), pp. 135–140. Another copy of this work (G. c. 21) is interesting on account of the inscription on an early page: "Liber Collegij S. et Individuæ Trinitatis, ex dono D: Gulielmi Bedelli SS. Theologiæ Doctoris hujusq; Collegij Præpositi: Augusti 1^o. 1627." It has the old press-mark, T. 3. 6. 17.⁹ Perhaps the work indicated by this title is *De Republica Ecclesiastica*, Libri X. auctore Marco Antonio de Dominis, Archiepiscopo Spalatensi. Londini, 1617. CC. a. 2 (NN. e. 20).

- C. 4.—†11. Franc. Suarez in 1^{am} et 2^{am} partem Thomæ. | fol. 1607.¹
 (M^r Fullerton)²
- 5.—11. Anton. Perez certamina 10. | Salmanticæ 1604. fol.³
 12. Burchardi Decretor. lib. 20. | Colon. 1548. fol.⁴
 17. Altercatio Synagogæ et Ecclesiæ. | fol.⁵
 19. Fr. Tolet in Johannem. | fol.⁶
- D. 2.—†18. Petri Blesensis Opera. | 1519. fol.
- 4.—16. *Hospiniani Historiæ Sacramentariæ pars prior.* | fol.⁷
- 5.—21. Leonis I. Sermones. fol.⁸
 22. Eusebij et Bedæ Historia Ecclesiast. Hagenosæ | 1506. fol.⁹
- E. 1. — 4. *Henr. Sedulij præscript. advers. hæreses.* | 4^o.¹⁰
 8. *David Paræus in 1^{am} ad Corinth.* | 4^o (M^r Bailye.)¹¹
 11. *Didaci Alvarez lib. 12. de gratiâ et lib. arbitr.* | 4^o.¹²
 †17. *Vet. Testam. Hebraic. pars 6^a Psalm. etc.* | 4^o.
- 2.—†19. Andreæ Riveti Isagoge in Scripturas | 4^o.
 †21. Dan. Tilenus in Bellarmin. de Verbo Dei. | 4^o.¹³ } M^r Puttock.

¹ CC. d. 23. *Commentaria ac disputationes in primam partem divi Thomæ de Deo uno et trino*, auctore R. P. D. Francisco Suarez Granatensi. Moguntiae, 1607.

² Sir James Fullerton, Ussher's schoolmaster, died in 1630. Ussher's *Works*, vol. i., p. 3. Possibly the Fullerton here mentioned was his kinsman.

³ CC. d. 10 (E. d. 16). *Laurea Salmantina Magrî F. Antonii Perez . . . continens pro parte priori scholastica decem et totidem interiecta certamina expositiva . . .* Salmanticæ, 1604.

⁴ CC. bb. 16 (H. e. 12). D. Burchardi Wormaciensis Ecclesiæ Episcopi *Decretorum Libri XX. ex consiliis et orthodoxorum patrum decretis . . .* Colonis, 1548. A note on the fly-leaf of the former copy (not apparently in Ussher's hand), runs: "Emi He[.] A^o 1612. 16 Jan. pro 5 s."

⁵ CC. d. 40. Colonis, 1537, September.

⁶ B. cc. 14. Colonis Agrippinæ, 1599. ⁷ CC. d. 32 (CC. b. 16). Tiguri, 1598.

⁸ BB. d. 30 (wants title and colophon).

⁹ DD. d. 10. Another copy (DD. b. 11) seems to have been acquired in 1862.

¹⁰ CC. e. 16 (CC. i. 7). Antverpiæ, 1606. The second copy has on the title-page the note (referring to the first copy): "A duplicate of this in Primate Ussher's Library mark'd D. 3. 3."

¹¹ Possibly this was William Bayly, who caused such trouble to Bishop Bedell, with the support of Ussher, and who afterwards became Bishop of Clonfert. Ussher's *Works*, i., p. 202; Jones' *Life of Bedell* (Camden Society), p. 177 *seq.*

¹² CC. kk. 24. *De auxiliis divinæ gratiæ et humani arbitrii viribus et libertate . . . Libri duodecim* auctore F. Didaco Alvarez. Lugduni, 1611.

¹³ *Disputatio Roberti Bellarmini . . . de controversia prima fidei christianæ. Quæ est de Verbo Dei scripto, quatuor libris comprehensa. Cum notis et animadversionibus Danielis Tileni Silesii.* Sedani, 1618.

- E. 3. †10. Jo. Matthæi distinct. Theolog. Centuriæ }
 2^a et sacr. Script. tradit. Patrib. et Pontif. } M^r Puttock.
 Roman. | 4^o.
 †12. Theodor. Thummius de verbo Dei, et 3. offic. Christi | 4^o.¹
 (M^r Puttock.)
 5.—23. Nic. Ciprianus (?) de immortalitate Adam. | 4^o.
 17. Theodoret. in Pentateuch. et Judic. | Græcè. | 4^o.
 removed to F. 5. 13.
- F. 1.—†3. Corvini Censura Anatomæ Molinæ.² | 4^o.
 (wth my Lo. of Ardagh)³
 4. Georg. Grossij Vindicat. Scripturæ tomus 1.^{us} | 4^o.⁴ (see
 M^r Puttock.)
 2. — 3. Sirmundi de eccles. Suburbicar. | 4^o.⁵
 †19. Whitaker de Scripturâ, contra Bellarmin. | 4^o.⁶ (M^r Puttock.)
 or Dean Sing hath it.⁷
 3.—11. Tridentina Synodus quare non continuata. | Argentorat.
 1565. 4^o.
 13. Calvini Institutiones. | Genevæ 1592. (M^r Nugent.)
 †18. Guil. Estius in difficilia loca Scripturæ. | 4^o.⁸ (M^r Fullerton.)

¹ (B. k. 12). *Disquisitio de Verbo Dei quadripartita* . . . a Theodoro Thummio, Tubingæ, 1625. The title of this volume has no mention of the three offices of Christ.

² *Petri Molinæ Novi Anatomici mala encheiresis, seu censura anatomæ arminianismi* . . . auctore Joanne Arnoldo Corvino. Francofurti ad Mænum, 1622.

³ John Richardson, scholar and subsequently fellow of Trinity College, became Bishop of Ardagh, on Bedell's resignation of that See, in 1633. Ussher bore striking testimony to his learning, *Works*, vol. x., p. 532.

⁴ CC. ee. 17. *Johannis Georgii Grosii Theatrum Biblicum, ex scriptis theologorum veterum atque recentium, maximam vero partem D. Amandi Polani p. m. concinnatum: quo vindicatio totius Scripturæ S. a corruptelis seu falsis interpretationibus piæ menti exhibetur.* Basileæ, 1614.

⁵ CC. ii. 45. *Censura coniecturæ anonymi scriptoris de suburbicariis regionibus et ecclesiis*, auctore Jacobo Sirmondo. Parisiis, 1618. This is correctly described as a quarto, though of small octavo size.

⁶ *Disputatio de sacra Scriptura contra huius temporis papistas, imprimis Robertum Bellarminum* . . . et Thomam Stapletonum. Cantab., 1588.

⁷ George Synge, Rector of Killary, Co. Meath, 1622–1638, Dean of Dromore, 1634, Bishop of Cloyne, 1638–1653. He championed his bishop's cause against the Jesuit Malone, publishing, in 1632, *A Rejoinder to the reply published by the Jesuites under the name of William Malone*.

⁸ CC. ee. 41. *Annotaciones Auræ in præcipua ac difficiliora sacra Scripturæ loca* auctore Gulielmo Estio. Colonie Agrippinæ, 1622.

- F. 4.** — 3. Whitaker de Ecclesia contra Bellarmin. | 4°. | ¹ Dean Sing.
 8. Sam. Wardi Gratia discriminans. | 4°. ²
 †33. Becani lib. 4. de Republ. Ecclesiast. contra Spalat. | 4°. ³
 (M^r Fullerton hath it still.)
 5.—17. *Theodoret. in Pentateuch. et Judic. Græcè.* | 4°. ⁴
 36. *Biblia Latina.* Antuerp. 1572. (M^r Nugent.)
- G. 1.**—18. *Prophetiæ ac Revelationes.* | Paris. 1523. 4°. ⁵
 3. — 1. Casauboni epist^a ad Front. Ducæum. | 4°. ⁶
 21. Fulk. in Apocalyps. | 4°. ⁷ } Arland Ussher.⁷
 22. Brightman in Apocalyps. | 4°. ⁸ }
 4. — 6. *Rosweydi retaliatio contra Casaubon.* | 8°. ⁹
 7. *Ejusd. Anticapellus.* | 8°. ¹⁰
 10. *Sohnij Operum tomus 1^{us}* | 8°. } M^r Baxter.¹¹
 11. *Ejusd. tomus 2^{us}* | 8°. ¹² }
 5.—†9. Rob. Coci Censura Patrum. 4°. ¹³ (wth D^r Donollan.)¹⁴
 †15. Ignatij epist. Græcolatin. Antuerp. 1566. 8°. ¹⁵ Quære.

¹ *Prælectiones de Ecclesia.* Ed. J. Allenson, Cantab., 1599.

² CC. k. 45. Londini. 1626.

³ DD. o. 62 (H. h. 33). Moguntia, 1618. "Spalat." is Marcus Antonius de Dominis, Archbishop of Spalato. The copy at H. h. 33 has the names of two former owners, viz.: "Thomas Moigne Lo. Bishop of Kilmore and Ardagh [1612-1629]," and "Jacobi Usserij."

⁴ F. II. 9. Isaaci Casauboni *Ad Frontonem Ducæum S. J. Theologum Epistola; in qua de Apologia disseritur communi Jesuitarum nomine ante aliquot menses Lutetie Parisiorum edita.* Londini, 1611.

⁵ BB. k. 19 (P. hh. 41). Londini, 1673.

⁶ BB. k. 17. *Apocalypsis Apocalypsea. Id est Apocalypsis B. Johannis analysi et scholiis illustrata . . . per Thomam Brightmannum.* Francofurti, 1609.

⁷ The grandson of Archbishop Henry Ussher, and thus first cousin once removed of Archbishop James Ussher. See Ussher's *Works*, vol. i., App., p. vi.

⁸ DD. o. 56. *Lex talionis XII. Tabularum Cardinali Baronio ab Isaaco Casaubono dicta: Retaliante Heriberto Rosweydo.* Antverpiæ, 1614.

⁹ *Anti-Capellus, sive explosio naeniarum Iacobi Capelli quas funeri Isaaci Casauboni ad legem XII. tabularum in vindictis suis accinuit.* . . . Antverpiæ, 1619.

¹⁰ CC. II. 19, 20. Sigennæ Nassoviorum, 1598; Herbornæ Nassoviorum, 1591.

¹¹ *Corr. s.* Baylie.

¹² *Censura quorundam scriptorum, quæ sub nominibus sanctorum et veterum auctorum a pontificiis . . . citari solent.* . . . Londini, 1614.

¹³ Margaret Ussher, grand-daughter of Archbishop Henry Ussher, married the Rev. Edward Donnellan, D.D., who may be the person here mentioned. Cf. note ⁷ above, and below p. 224, note ⁸.

¹⁴ BB. gg. 38. This little volume has played a not unimportant part in the history of early Christian literature. At the beginning is written, in Ussher's

- G. 5.—22. *Collatio Carthag. à Papirio Massono edit.* | 8°.¹
 40. Jo. Molanus de *Imaginum usu.* | 8°.²
- H. 1.—†5. Raban. Maur. de Institut. clericorum. | 8° (M^r Fitz-Gerald.)³
 2.—18. *Theodoretī Sermones de Provident. Græcolat.* | 8°.⁴
 5.—2. Stapleton in 1. et 2. ad Corinth. | 8° (*Antidot.*)⁵ (M^r Bailye)
 † 24. *Testamentum Græcum.* | Paris. 1549.
- I. 1. — 1. Ægidij de Co[....] resp. de absolutione moribundi, etc.
 | Antuerp. 1625. 8°.
 14. *Expositio quædam in epist. ad Corinth.* | 8°.
 † 25. Hearnij (?) legatio ad Indos. (lent S^r John Clotworthy.)⁶ Quære.
 39. *Collationis Carthag. historia per Balduinum.* | 8°.⁷
 3.—8. *Optatus, Leidæ editus. an. 1613.* 8°. |
 13. *Danæus in Symbol. Apostolor.* | 8°.⁸
 †*16. *Armachani Defensorium Curatorum.* | Paris. 1625. 8°.⁹ (see James Nugent.)¹⁰

hand, "Collat. [cum] vetere [...]ne MS. [ex bi]bliotheca Collegii Caiiani Cantabrigiæ: [...] quæ [...] inclusa [sunt] omnia aberant." See Lightfoot's *Ignatius*, vol. i., pp. 76, 80 sq. Lightfoot does not appear to have known this volume. Ussher seems to have taken it with him to England in 1640. See below, p. 260, note ⁵.

¹ (E. mm. 37). *Gesta collationis Carthagini habitæ Honorii Cesaris iussu inter Catholicos et Donatistas*. . . . 1596. Has the early press-mark, T. 3. 3. 22.(P)

² (FF. oo. 16). *De picturis et imaginibus sacris liber unus*. . . . Lovanii, 1570. Ussher's copy, of an edition published at Sedan, was sent to him in June, 1636. *Works*, xvi., p. 525.

³ A Mr. Fitzgerald carried a letter from Primate Ussher to Bedell, then Provost of Trinity College, in 1629; another (for he can hardly have been the same) was appointed to a scholarship at Queen's College, Oxford, on his recommendation, in 1651. *Works*, xvi., pp. 502, sq. 568.

⁴ DD. p. 27 (E. mm. 42). *Antidota apostolica contra nostri temporis hæreses. In duas B. Pauli Epistolas ad Corinth.* Tomus III. Antverpiæ, 1598.

⁵ The first Lord Massereene, a well-known Irish landlord and a strong Puritan. See the *Dictionary of National Biography*, vol. xi., p. 126.

⁶ DD. n. 35. "Ex rerum ecclesiasticarum commentariis Fran. Balduini." Parisiis, 1566. This volume has a marginal note in Ussher's hand.

⁷ BB. m. 44 (title page mutilated).

⁸ Press A. 2. 16. *Richardī [Fitz Ralph] Archiepiscopi Armachani . . . Defensorium Curatorum adversus eos qui privilegiatos se dicunt habitum Avenione in consistorio coram D. Papa Innocentio 6. . . . anno Christi 1557.* Parisiis, 1625. This very rare volume once belonged "à l'Egl. de Paris."

¹⁰ James Nugent became a Franciscan friar, and entered the priesthood, but

- I. 3.—18. *Pithæi glossarium, et Hieron. de hæresib.* | 8°.¹
 35. *Georgij Cassandri Ordo Romanus.* | 8°.²
 4.—†21. Leonis X. et Francisci I. concordat. etc. cum plurib. alijs. | 8°.
 5.—†9. Hugo Grotius de veritate religionis. | 12°. (Dean Sing.)
- K. 1.—13(?) *Jo. Functij Chronologia. fol.*³ (M^r Fullerton.)
 17. *Petrovius de doctr*[...] |
 2. — 9. Messingham de Sanctis Hiberniæ. fol.⁴ (Lo. of Derrye.)⁵
 3. — 6. Lansbergij Progymnasmata Astronomiæ restitutæ. | 4°.⁶
 13. *Alphabetum artif*[...] |
 17. Scip. Claramontij Anti-tycho. 4°.⁷ (lent to M^r Hamond.)⁸
 19. Juvenalis et Persius. 4°.⁹
 4.—21. Ludov. de Dieu Grammatica Hebræa et Compend. Radicum.

about the end of 1629 he left the Church of Rome, probably under Ussher's influence. *Works*, xvi., pp. 508–511.

¹ BB. m. 2. A volume of tracts containing: (1) *Aristea de Legis Divinæ ex Hebræica lingua in Græcam translatione* . . . historia . . . edita ab Eldano de Parchun Obotrita. Francofurti, 1610. (2) *Francisci Pithæi Glossarium in capitula Caroli magni et Ludovici pii* ab Ansegiso Abbate et Benedicto Levitâ collecta. Parisiis, 1603. (3) *Sancti Hieronymi Stridonensis Indiculis de hæresibus Iudeorum* . . . curâ Cl. Menardi. Lutetiæ Parisiorum, 1617. There are notes in Ussher's hand throughout the volume.

² BB. o. 5. Coloniz, 1661. Notes in Ussher's hand. With the Ordo is bound another liturgical work by Cassander. There is another copy, of the Ordo only, at (C. n.) 1.

³ DD. bb. 34. *Chronologia: hoc est omnium temporum et annorum ab initio mundi usque ad annum a nato Christo MD. LII in prima editione ab auctore deducta: post ab eodem recognita, aucta et in annum 1666. Indequ tandem ab alijs in hunc usque annum præsentem 1578 producta computatio* . . . autore Ioanne Funccio. Witebergæ, 1578.

⁴ DD. d. 30 (V. g. 17). *Florilegium Sanctorum seu vitæ et acta sanctorum Hiberniæ*. Parisiis, 1624.

⁵ John Bramhall, Bishop of Derry (1634–1660).

⁶ EE. g. 68, No. 4. *Liber i. De motu solis*. Middelburgi, 1619. Now (but apparently not originally) bound with three other tracts, two of which have notes in Ussher's hand.

⁷ *Antitycho in qua contra Tychonem Brahe . . . demonstratur cometas esse sublimares non coelestes*. Venetiis, 1621.

⁸ If this was Henry Hammond, and if (as I shall endeavour to prove) the library to which our lists refer was that of Archbishop Ussher, these remarkable men must have become acquainted with one another at an earlier date than appears to have been hitherto supposed. See Ussher's *Works*, vol. i., p. 232.

⁹ R. oo. 55. Hanoviz, 1603. Belonged to "Roger Twysden."

- L. 1. — 3. fol.
 4. fol.
 9. fol.
 13. fol.
 15. fol.
 16. fol.
 18. fol.
2. — 3. Dan. Chamieri *Controversiarum tomus 3^{us} de peccato
 Justificat^o hominis (?)*, Merito.¹ (M^r Nugent.)
3. — 8. *Claudianus cum notis Barthij.* | 8^o
- M. 1. — 6. *Arrianus de Vita Alexandri* (sic), *Græcolatin.* fol.²
 17. *Ptolemæi Geographia, Romæ. 1490.* fol.³
- N. 1. — †9. *Franc. Lichetus in libros Sententiarum.* fol.⁴ (James Nugent.)
 23. *Ja. Christmanni Theoria Lunæ.* fol.⁵
2. — 5. *Onuphrius de Roman. Principus.* (sic) fol.⁶
 9. *Salmasius et Casaubonus in Historiæ Augustæ script.* | fol.
3. — †4. *Mollerus in Psalmos.* | fol.⁷ (M^r Puttock.)
 11. *Zanchij Operum, tomus 1. 2. 3 Dunkin Ducki Dunkin*
 12. *Tomus 4. et 5.*
 †13. *Tomus 6* } lent to M^r Travers⁸
 †14. *Tomus 7. et 8* } *Dunkin.*

see B of Down⁹ for
 Commentaries on y^e
 epistles
 James Nugent.

¹ GG. dd. 13. The title of Tom. i. is *Panstratiæ Catholicæ, sive controversiarum de religionis adversus pontificias corpus* . . . Genevæ, 1626. Tom. iii. substitutes for sive etc., *Tomus tertius de homine corrupto et instaurato.*

² EE. b. 4. *Arrianni (qui alter Xenophon vocatus fuit) De expidit. Alex. magni historiarum libri viii., ex Bonavent. Vulcanii Brug. noua interpretatione* . . . *Alexandri vita, ex Plut. eiusdem Libri ii.* . . . [Parisii], 1576.

³ DD. aa. 10.

⁴ CC. d. 32 (E. b. 17). Reverendissimi P. F. Francisci Leuchetti . . . in *Joan. Duns Sco. super primo. secundo. tertio [Petri Lombardi Sententiarum] et quodlibetas clarissima comentaria* (sic) . . . Parisiis, 1524.

⁵ EE. ee. 11. A.D. 1611.

⁶ EE. d. 4. *Onuphrii Panvinii Romanorum principum et eorum quorum maxima in Italia imperia fuerunt libri iiii. Eiusdem de comitiis imperatoris liber* . . . Basilæ, 1558.

⁷ *Enarrationis Psalmorum Davidis, ex prælectionibus D. Henrici Molleri* . . . Genevæ.

⁸ Perhaps Joseph Travers, husband of Dorothy Ussher, grand-daughter of Primate Henry Ussher. See Ussher's *Works*, vol. i., App., p. vii.

⁹ Henry Leslie.

fol. 9 r.

*L[. . . .] Scriptores d Rigaltio (?) editi | 4°.*¹

- O. 3. — ~~6~~ 7. Tremellij Biblia | fol.
 9. Serarius in Reg. et Paralipomen. fol.²
 16. Homiliæ diversorum Patrum. | Basil. 1516. fol.
 18. Simonis de Cremona Postilla in epist. Dominical. | 1484. fol.
- P. 2. — 6. Hub. Goltzj Thesaurus Antiquitatum. | fol.³
- Q. 1.—19. Constantini Porphyrogenneta Opera Græcolat. | 8°.
 †24. Jo. Buxtorfj Thesaurus Grammaticus. | 8°.
- R. 1.—10. Licetius de Lucernis⁴ | D. Arthure
 2. — 1. Lipsij Electa⁵ et Canteri⁶ varis lectiones: et Erasmi
 lingua | lent my Lo. of Kilnemeka.⁷
 8. Petri Malthæi Continuatio Decretal. | Francof. 1590.
 19. Kepleri Logarithmi, et Hyperaspistes contra Scipionis
 Claramontij Anti-tychonem.⁸ (lent S^r Henry Bourghcier
 but had back againe.)
 29. Adamnanus de Situ terre Sanctæ. | 4°.¹⁰

¹ Written at the top of the page. The space below is occupied with the essay "De Amore," mentioned above, p. 216.

² BB. bb. 14. Moguntis, 1617. Serarius had a faculty for getting lost. A copy which Ussher had lent to some one was mislaid, and a new one procured to replace it, in 1620. *Works*, xvi., p. 373.

³ EE. a. 12. Antverpiæ, 1618. A quarto volume, but of small folio size.

⁴ (SS. m. 51). Fortunius Licetus *De Lucernis antiquorum reconditis libb. quatuor*. Venetiis, 1621.

⁵ A rare book. There is an imperfect copy in the British Museum. The title, as given in the B. M. Catalogue, is "Justi Lipsii *Electorum Liber I. In quo præter censuras, varij prisici ritus*. Antverpiæ, 1580. 8°."

⁶ Qy. Cautei.

⁷ So the word appears to read, both here and in the fourth list. But no such place-name is known to me.

⁸ EE. k. 56. A volume containing: (1) *Johannis Kepleri Chilias Logarithmorum ad totidem numeros rotundos . . . Marpurgi, 1624.* (2) *Tychonis Bruhei Dani Hyperaspistes adversus Scipionis Claramontii . . . Anti-tychonem, in aciem productus à Joanne Keplero . . . Francofurti, 1625.*

⁹ Fellow of Trinity College, 1601; became Lord Bath in 1636. He was a benefactor of his College, and a constant correspondent of Ussher.

¹⁰ EE. i. 50. Ingolstædii, 1619.

R. 4. — 7. Alanus redivivus, per Andr. Coppenstein. 8°.¹ (lent, I think, unto my nephew Jones.)²

15. *Nicephori C P. Chronicon Græcolatin*: | 8°.

S. 1. — 5. 4°

2.—15. *Christmannus in Alfraganum*. | 8°.³

19 Cardanus de Subtilitate. | 8°.⁴

26. *Oxon. Academ. Parentalia Jacobo R. etc.* | 4°.⁵

T. 1.—15. 8°

2.—19. *Nicephori Blemmydæ Epitome Physic. Græc.* 8°. | ⁶

3.—†18. Nathan. Carpentarij *Philosophia libera*. | 8°.⁷ (my nephew Jones)

4.—19. } Josephi Antiquitates. 8°. lent Arland Ussher.
20. }

5.—†3. Edwardi Didoclavij *Confutatio Paræneseos Tileni. et Hieron. Philadelph. contra Spotswood*.⁸ | 8° (said to be lent at y^e Colledge.)

¹ BB. o. 35. *B. Alanus de Rupe redivivus de Psalterio seu rosario Christi ac Mariæ: eiusdemque Fraternitate rosaria*, auctore R. P. F. Ioanne Andrea Coppenstein. Moguntiae, 1624. Bound with *Quodlibetum Coloniense de fraternitate s. Rosarii B. V. Mariæ auctore R. P. F. Michaelo ab Insulis* . . . reproductum ab R. P. F. Ioanne Andrea Coppenstein. Coloniae, 1824.

² Probably a son of Dr. Lewis Jones, Bishop of Killaloe, who married Ussher's sister, Mabel. The note is in Ussher's hand. "Nephew Jones" is mentioned by Ussher in a letter to his daughter. *Works*, xvi., p. 297. Perhaps he is the Mr. Joanes who examined Syriac type for Ussher, in 1637. *Ib.*, p. 29. Compare below, p. 264, note ³.

³ L. nn. 53. *Muhamedis Alfragani Arabis Chronologica et astronomica elementa* . . . authore M. Jacobo Christmanno. Francofurti, 1618.

⁴ L. n. 23. Hieronymi Cardani *De subtilitate libri XXI.* . . . Lugduni, 1580.

⁵ DD. hh. 56 contains various tracts, the first of which is *Oxonienis Academiae parentalia. Sacratissima memoria . . . Iacobi . . . dicata*. Oxoniae, 1625. It is found also at (P. mm. 37).

⁶ EE. ii. 48. Ed. Iohannes Wegelinus. Augustæ Vindelicorum, 1605.

⁷ EE. kk. 13. Authore N. C. Cosmopolitano. Francofurti, 1621.

⁸ BB. kk. 31. *Altare Damascenum seu politia ecclesiae Anglicanae obtrusa ecclesiae Scoticae a formalista quodam delineata illustrata* . . . opera Edwardi Didoclavij [= David Calderwood]. *cvi* locis suis interserta *Confutatio Paræneseos Tileni ad Sotos* . . . et adjecta epistola Hieronymi Philadelphi de regimine ecclesiae Scoticae. *Ejusque Vindicie contra calumnias Iohannis Spotsuodi Fani Andreae pseudoarchiepiscopo per anonymum*. 1623.

U. 2.—32. *Ephemerides.* 8°.

3. — 8. Baronius de Ente et essentiâ. 8° (Lo. of Ardagh.)

†40. Jacobus Martinus de primâ generatione. 8°¹ (nephew Jones.)46. *Gemini elementa Astronomiæ Græcolatin.* | 8°.4.—†46. *Florentij Wigorniensis Chronicon.* 4°² (sent to Vossius)³*Third List.*—fol. 9 r.⁴Recensio Librorum facta anno
1639(?)⁵ die 22 Aprilis.

Desunt in A 1.

1. Maij Concord. Hebr. To. 1.

2. Tom. 2^{dus}3. Tom. 3^{us}4. Tom. 4^{us}5. Pagnini Lexicon Hebr.⁶*Concilia Latin. Merlini. To. 7^{mus} et 8^{dus} 8*D. Boate.⁷

Desunt in A 2.

8. *La Bigne Tom. 7^{mus} et octavus*9. *Eiusdem Tomi noni pars prima*11. *Eiusdem Tom. 10^{mus} et 11^{mus}*14. *Eiusdem Tom. 13^{mus} 14^{mus} 9*¹ Jacobi Martini Scoti *De prima simplicium et concretorum generatione . . . disputatio.* Cantabrigiæ, 1584.² DD. ii. 63. Londini, 1592. Has notes in Ussher's hand.³ Probably Gerard John Voss, to whom Ussher dedicated more than one of his books.⁴ The hand of this list is different from that of the preceding.⁵ Altered from 1634(?)⁶ EE. aa. 2 (SS. aa. 22). *Thesaurus linguæ sanctæ sive lexicon Hebraicum.* Lugduni, 1577. (FF. cc. 19: Colonisæ Allobrogum, 1614).⁷ Dr. Arnold Boate, a Dutchman, who lived in Dublin. He corresponded much with Ussher. *Works*, i., 267, xvi *passim*, Carr's *Life and Times of Ussher*, p. 363. This note has been added by the writer of the fourth list.⁸ CC. aa. 6. Paris, 1524.⁹ BB. cc. 8, 9, 11, 14. De la Bigne's *Magna Bibliotheca veterum Patrum*: Colonisæ Agrippinæ, 1618. In this copy the volumes are arranged by the binder so as exactly to agree with the description in the list.

In A 3 *desert* desunt

3. *Cyrelli Alexandrin. Epistolæ Tom. 1^{mus} et secundus*

A 1. A 3. A 6(?).

In A 4.

In A 5.

1(?). *Baronij Martyrologium.*¹

11. *Bzovij Continuatio in Baronium Tom. 16^{us}*²

15. { *Pet Opmeeri Chronogr. To. 1^{mus}*
*Laurenti. Beyerlenck. Tom 2^{dus}*³

B 1.

B 2.

Epiphanij Tom. 2^{dus}

12. *Eusebij Pamphili Chron. 1. 2 cum notis Scaligeri*⁴

15. *Joannis Christophor. Hist. Eccles. græcol.*⁵

B 3.

4. *Nicephori Callisti histor. lib. 18. et histor tripar. Lib 12.*⁶

6. *Concordant. Bibl.*

8. *Tertullianus cum notis Ludovici.*⁷

10. *Cæcilij Cypriani To 1. 2 et 3^{us} cum notis Pamelij.*

13. *Anton. Agelius in psal. et cantic. divin.*⁸

¹ C. d. 16. Romæ, 1586 (C. f. 22. Venetiis, 1597: old press-mark T. 11. 12. 16).

² DD. a. 20. A. D. 1624.

³ DD. bb. 31. *Opus Chronographicum orbis universi a mundi exordio usque ad annum 1611 . . . in duos tomos divisum. Prior auctore Petro Opmeero . . . posterior auctore Laurentio Beyerlinck . . . Antverpiæ, 1611. The two volumes are bound in one, as indicated in our list.*

⁴ DD. bb. 8 (MM. d. 19). *Lugduni Batavorum, 1606. In the margins there are some notes in Ussher's hand.*

⁵ *Christophorson's Historiæ ecclesiasticæ scriptores Græci. Several copies of different editions are now in Trinity College, viz.: G. a. 21. Coloniz Allobrogum, 1612; G. c. 31. Coloniz Agrippinæ, 1581 (both fol.); and (G. n. 37), Lovanii, 1569. 8°: old press-mark, T. 2. 8. 8. The books in B 3, and therefore probably those in B 2, appear to have been fol.: see second list.*

⁶ DD. b. 14: *Francofurt., 1588 (HH. d. 32: Parisiis, 1562). This edition of Nicephorus, and of the Historia Tripartita of Cassiodorus, bears the name of Joannes Langus.*

⁷ BB. dd. 19. *Lutetiz Parisiorum, 1624.*
⁸ BB. a. 24. *Antonii Agellii Commentarii in Psalmos et in Divini Officii canticis. Parisiis, 1611.*

fol. 9 v.

B 4.

12. { Apostol. Concil. veterum decreta græcol.
 { Ignatij Epistol. 12. græcolat. cum quibusdam alijs Scriptoribus.¹
 14. Zach. Vrsini Tractat. Theolog.²

B 5

C 1.

- 6^{tes} deest, cuius nomen catalogo non inscribitur
 7. melch. Goldast de reg. pol. et eccless. Rom. monarch. To. 3^{us} ³
 8. deest cuius nomen etiam catalogo non inscribitur
 13. { Flacci Albini opera
 { Paulini Aquilensis Patriarch. lib. 3.⁴

C 2.

1. Mich. Ghisler. in Jerim. To. 1^{mus} ⁵
 4. Clement. Alex. Stromat. græcolat. ab Heinsio ⁶
 9. { Nicolai Harpsfeild hist: Eccles. Anglican.
 { Edmun. Campion de divortio Henrici 8^{vi} ⁷

¹ DD. dd. 13: A.D. 1560 (D. d. 1: A.D. 1559). *Theologorum aliquot Græcorum veterum orthodoxorum libri Græci et iidem Latinitate donati.*

² CC. e. 19. Neustadii Palatinorum, 1584 (F. c. 21: *ib.*, 1589).

³ CC. bb. 27. *Politica Imperialia sive discursus politici, acta publica et tractatus generales . . . ex bibliotheca . . . Melchioris Goldasti.* Francofurti, 1614. (H. e. 8. *Monarchia S. Romani Imperii, sive tractatus de iurisdictione imperiali seu regia & pontificia seu sacerdotali . . .* Hanovise, 1611).

⁴ CC. c. 21. *B. Flacci Albini seu Alchvini . . . opera. . . Accessere B. Paulini Aquilensis Patriarchæ contra Felicem Urgel. Episc. libri iii. . .* diligentia Andreæ Quercetani. Lutetiæ Parisiorum, 1617.

⁵ BB. aa. 14. Michaelis Ghislerii in *Jeremiam commentarii. Item in Baruch et breves D. Io. Chrysost. in Ieremiam explanationes, & octo Origenis homiliæ . . . Tomus Primus.* Lugduni, 1623.

⁶ BB. ff. 8 (C. dd. 3). Lugduni Batavorum, 1616 (LL. d. 12. Lutetiæ, 1629). This is an edition of the *Works* of Clement: but of course the *Stromata* occupy a large part of it.

⁷ DD. c. 21. Edited by Richard Gibbon. Duaci, 1622.

C 3.

4. Bellarmini opuscula tom. 5^{tas} et 6^{tas} 1

C 4.

C 5.

1. Chrysost. Henriques fasciculi Sanctor Cisterciens.²
10. Andreas Massius in Josua³

D 1.

D 2.

11. Francisci Mason vindiciæ Eccles. Anglican.⁴
13. Rabbi David Kimchj in Psalmos
14. Isaaci Casauboni exercit 16 de sacris⁵
15. Baptistæ Veneti Speculum.⁶
17. Bernhard de Breydenbach.⁷

D 3.

D 4.

1. { Math Cantacuzen. in Canticum cum notis Vincent. Rich.
Euseb. Cæsar. in canticum⁸
9. Onuphrij Panuini Epitome Pontif.⁹
10. Math. Parkeri de antiq. eccles. brit. et privileg. Eccles. Cantuar¹⁰

¹ GG. cc. 4(?). Colonis Agrippinæ, 1617.

² Fasciculus sanctorum ordinis Cisterciensium, completens ascetarum clarissimæ gesta. . . . Colonis Agrippinæ, 1631.

³ BB. e. 35. Iosue Imperatoris Historia illustrata atque explicata ab Andrea Masio. Antverpiæ, 1674.

⁴ BB. nn. 4. Editio secunda . . . ex idiomate Anglicano traductum, et locupletatum ab ipso autore. . . . Londini, 1638.

⁵ Isaaci Casauboni De rebus sacris et ecclesiasticis. . . . Londini, 1615.

⁶ DD. d. 20. Speculum fratrum Carmelitarum noviter impressum ["per Reuerendum Sacræ theologiæ magistrum baptistam uenetum de cathaneis eiusdem sacri ordinis magna cum diligentia emendatum anno domini m.ccccvii. xx. chal. aprilis."]

⁷ DD. b. 32. Sanctarum peregrinationum in montem Syon ad venerandum Christi sepulchrum in Jerusalem. atque in montem Synai ad diuam virginem et martirem Katherinam opusculum. Moguntis, 1486 (Feb. 6).

⁸ BB. e. 20. Romæ, 1624. ("Rich." = "Richard").

⁹ DD. d. 26. Venetiis, 1557.

¹⁰ DD. c. 24 (G. d. 19). Hanovis, 1605.

D 5. .

10. Jo. Cantacuzeni Christ assertio¹
11. Historia sanctorum
13. Cassiodor senator in psal.²
15. J. Capgravij legend. Angl.³
21. Leonis primi sermones
22. { Eusebij histor Eccles.
Beda hist eccles. gent Ang.

E 1.

2. Conrad. Kircheri concord vet. test. Hebraicogræc. pars 1^{ma}
3. Eiusdem pars secunda⁴
8. David Pareus in 1^{ma} ad Corinth.
21. Tho Cantuar mart, vita et processus.⁵

E 2.

2. Jacobi Capelli vindiciæ pro Casaubon.⁶
3. Eiusdem historia sacra.⁷
17. Andr. Rivetus in Psal: prophet⁸
18. Idem in Hoseam, et Isaiam.⁹
23. { Origenis philocalia græcol.
Zacharias de mundi opificio
Etcet.¹⁰

¹ BB. nn. 18. Christianæ religionis acerrimi propugnatoris D. Ioannis Cantacuzeni Imperatoris Constantinopolitani . . . contra Saracenorum hæresim, pro Christiana religione Apologia iii. Eiusdem contra Mahometem Orationes iiii. . . . Basilie, 1543 (title page missing). ² BB. bb. 24. Basilie, 1491.

³ B. dd. 35. "Explicit (Nova legēda anglie). impressa lōdonias: i domo Winādi de Worde: cōmorātis ad signū solis: in uico nūcupato (the flete strete). Anno dñi. mccccxvi. xxvij. die Februarij."

⁴ CC. f. 16, 17. *Concordantiæ veteris testamenti Græcæ, Ebræis vocibus respondentēs πολύχρηστοι*. Francofurti, 1607.

⁵ DD. e. 14. Parisiis, 1495, 2 April. The life of St. Thomas, known as the Quadrilogus. With it is another treatise, Bertrandus, *De jurisdictione Ecclesiæ*. There are notes in Ussher's hand.

⁶ BB. nn. 19. Francofurti, 1619. (Bound with another tract by Capellus).

⁷ DD. k. 34 (M. f. 13—with signature, "James Usher, S.S.T.D.") (PP. nn. 70). *Historia sacra et exotica ab Adamo usque ad Augustum* . . . Sedani, 1613.

⁸ CC. ce. 45. *Commentarius in Psalmorum prophetarum, de mysteriis evangelicis, decadem selectam*. Lugduni Batavorum, 1626.

⁹ CC. ce. 46. *Com. in Hoseam* . . . Accessit explicatio cap. iiii Esaiæ propheta. Lugduni Batavorum, 1625. Ussher's arms are stamped on the cover.

¹⁰ BB. i. 10. *Operâ et studio Io. Tarini*. Parisiis, 1619.

E 3.

16. { Nieh Grevinchouij Apologia
Joannis Wenbomgard: resp. ad fest, aliorumque opera ¹
17. { Joan. Arnoldi Corvini responsio ad Bogerman. pars 1^{ma} ²
20. Remonstrant. resp. ad contraremonstr. ³
24. Tileni, et Cameronis collat. de gratia et Liber. Arbit. ⁴
25. { Joan. Drusij fragm. in vet Test.
Nicolai Ores de incremento Evangelij ab an. 1517.
Tarnovij exercitatio Bibl ⁵
26. Jo. Vossij Lib. 7 de controver. Pelagian. ⁶

E 4.

6. David. Hoeschelij edit. eclog. Legation. et excerptorium a. 1.
Diodor. Siculi amis. græc. ⁷
10. { *Petrus Bertius de Apostasia*
Erycius Puteanus in Casaubon ad Front Ducem ⁸

¹ DD. o. 32. A volume of tracts, containing: (1) Nicolai Grevinchovii *Apologia publica et privata, hoc est, Absterio calumniarum Adriani Smoutij*. . . Roterdami, [1617]. (2) Ioan. VVtenbogardi *Responsio ad ea quæ illi speciatim impigit Hommius*. . . Lugduni Batavorum, 1618; and three others.

² BB. kk. 4. Lugduni Batavorum, 1614. Contains the second, as well as the first part.

³ BB. ii. 6. *Responsio necessaria ad Contra-remonstrantium contrariam declarationem*. . . versa e Belgico in Latinam sermonem. Lugduni Batavorum, 1618.

⁴ CC. l. 11. *Amica collatio de gratiæ et voluntatis humanæ concursu in vocatione et quibusdam annexis*. Lugduni Batavorum, 1622.

⁵ B. k. 14. Volume of tracts, containing: (1) *Interpretum veterum Græcorum quæ extant in totum Vetus Testamentum fragmenta collecta*. . . a Johanne Drusio. Franekeræ Frisiorum, 1619. (2) *Johannis Tarnovii Exercitationes Biblicæ*. Rostochii, 1619. (3) *Dissertatio ecclesiastico-historico-politica: de admirando prorsus renati evangelici solis ortu cursuque et progressu ab anno 1517 usque in annum 1617 . . . adiecta concio . . . habita Romæ ad Urbanum V. Papam Cardinalesque et Prelatos eius anno 1564*. Per Nicolaum Orem, Typis Spiissianis, 1618.

⁶ DD. l. 20. Gerardi Johannis Vossii *Historiæ de Controversiis quas Pelagius eiusque reliquiæ moverunt libri septem*. Lugduni Batavorum, 1618. Some marginalia in Ussher's hand.

⁷ EE. f. 17. *Eclogæ legationum*. . . cum corollario excerptorum e libris Diodori Siculi amissis xxi-xxvi. Augustæ Vindelicorum, 1603.

⁸ CC. e. 36. Volume containing the two following: (1) *Petri Bertii Hymenæus Deseritor, sive de sanctorum apostasia problemata duo l. an fieri possit ut justus deserat justitiam suam? 2. an quæ deseritur fuerit vera justitia?* Francofurti, 1612. (2) *Eryci Puteani in Is. Casauboni ad Front. Ducem*. . . *epistolam stricturæ liber prodromus*. Lovanii, 1612.

12. Eusebij Chronic.¹
17. Joan. Potkin edit Psalter David Æthiopicum.²
20. *Joan Fílesua selector. Lib i^{mss}*³
21. Georg. Downam. Papa Antichrist.⁴
22. { *Rab Jud. de accentis Script.*
Merceri notæ etc.
*Chaldæi Expositio in Abdia etc*⁵
24. *Magnum Speculum Exemplorum, a Johanne Maiore recognitum*⁶
25. Francisc. Junius in tria capita Genes. et confutat 22 argu-
mentor. *Simplicij*
26. { *Philipi (sic) Solitarij dioptra*
Nicolai Cabasilæ Lib. 6.
*Aliorumque opera*⁷

E 5.

1. Hieronym. in vitas Patrum⁸
2. Amand. Polani syntagma To. 1^{mss}
3. Tom. 2^{dus}⁹
12. Bibl. Latin.
16. *Psalter. Hebr: Græc. Chal. et Latin*¹⁰
17. Theodoret in Pentateuch. et Judices e loco proprio ad f. 5.13.
mutatus

¹ DD. bb. 8. Scaliger's edition. Lugduni Batavorum, 1606. The margins have notes in Ussher's writing.

² This appears to be C. f. 10. *Psalterium in quatuor linguis Hebræa, Græca Chaldaea [i.e. Æthiopica] Latina.* Colonis, 1518. Potken had previously edited the Psalms, with other parts of the Old Testament, in Ethiopic (1513).

³ CC. i. 13. Parisiis, 1621.

⁴ BB. hh. 5.

⁵ CC. g. 47. A volume of eight tracts, published at Paris, under the editorship of Johannes Mercerus, in various years between 1557 and 1566. The first seven are Chaldee Paraphrases of several books of the Old Testament; the eighth has the title, *Liber de accentis Scripturæ author. Iuda filio Balaam nunc primum editus opera Io. Merceri.* Parisiis, 1565.

⁶ DD. k. 48. *Magnum Speculum Exemplorum ex plusquam octoginta autoribus . . . ab anonymo quodam qui circiter A.D 1480 vixisse deprehenditur . . . studia Ioannis Maioris.* Quinta editio. Duaci, 1614 (G. l. 16. Editio tertia. Duaci, 1608).

⁷ CC. kk. 16. A collection of treatises, "nunc primum latinitate donata a Iacobo Pontano." Ingolstadtii, 1604.

⁸ BB. i. 1. Notes in Ussher's hand.

⁹ CC. e. 32, 33. Hanovis, 1610.

¹⁰ CC. f. 10. Colonis, 1518.

19. Postilla super Evangel. et Epistol.
20. Corona Mariæ
22. Ja. de Voragine; Legend aur.¹
23. Tho Zerolæ praxis Episcopalis²

F 1.

3. Corvini Censura Anatomæ Molinæ; (in priori notatus recensione)
4. Geor. Groseij vindicat. Scriptur. To. i^{mus}
8. Baptistæ Ferrarij nomenclatura Syriac.³
14. Joan. Morini exercit. eccles.⁴
15. Jo. Chenu. hist. Chronolog. de Episc. Galliæ⁵
16. Thomæ Erpenij peal. edit Syriacol.⁶
20. Isidor. Mosconius de maiestat. Eccles. militant.⁷
21. Gabrielis Albasini observat Lib. 2.⁸

F 2.

2. Concil. et Apostol. decreta græcolat. edit ab Elia Ehinger.⁹
3. Ja. Sirmundi de Ecclesijs Suburbicar.
21. Tho Bilson de perpetua Eccles. Gubernatione¹⁰
23. Arnoldi de Raisse auctar. ad natal. Sanct. Belg.¹¹

¹ DD. e. 29. *Legenda opus aureum, quod Legenda Sanctorum vulgo nuncupatur diligentia fratris Claudii de Rota . . . cum historia Lombardica & duobus repertoriis.* Lugduni, 1536.

² CC. dd. 42. Lugduni, 1607 (H. g. 38: *ibid.*, 1615).

³ Q. ff. 32. Romæ, 1622.

⁴ DD. e. 41. *Exercitationum ecclesiasticarum libri duo. De Patriarcharum et Primatum origine, &c., &c.* Lutetiæ Parisiorum, 1626.

⁵ DD. k. 37. *Archiepiscoporum et episcoporum Galliæ chronologica historia* auctore Ioanne Chenu. Parisiis, 1621.

⁶ CC. g. 14. Lugduni Batavorum, 1625.

⁷ CC. dd. 38. Venetiis, 1602.

⁸ BB. f. 13. Gabrielis Albasini Aurelianensis episcopi *De veteribus ecclesiarum ritibus observationum libri duo . . .* Lutetiæ Parisiorum, 1623.

⁹ CC. hh. 47. *Apostolorum et sanctorum conciliorum decreta & canonicorum divi Hilarii Pictaviensis et Augustana bibliotheca . . . edita.* Witebergæ, 1614.

¹⁰ BB. nn. 20 (LL. ii. 51). "recognitus . . . et Latine redditus." Londini, 1611.

¹¹ DD. n. 7. *Ad natales Sanctorum Belgii Ioannis Molani auctarium . . .* auctore Arnoldo de Raisse. Duaci, 1626. Ussher's arms are stamped on the boards.

fol. 10.

F 3.

1. *Sam. Collin. assertio Tortur. Torti*¹
6. Ja. Pamelij Liturg Latin Eccles. To. 1^{mus}
7. Eiusdem tomus 2^{dus}
8. Ja. Gretseri de divis, et Episc. Eccles. Eustettensis²
13. Joan. Calvini Institut. (prior. Libror. Recensione recens.)
14. Joannis Gualterij Chronicon Eccles. Lib. 1^{mus}⁴
15. *eiusdem Lib. 2^{dus}*⁵
18. Guil Esthij in difficilia Loca Scrip. (priori recensione defuisse notatus)
19. Hugo Grotij defens. fidei et (sic) satisfactione Christi adversus Socinum.

F 4.

1. { Ammonij Alex. continuat: narrat. evangel. Histor.
Gregorij Nazianz. secund. Evangelist. miracul. et Parabol.
varior. Author. fragmenta⁶
3. Guil. Whitakeri Controvers. de Eccles. et concion (sic) ad Clerum.⁷

¹ *Increpatio Andreæ Rudamono-Iohannis Iesuitæ de infamo parallelo, et renovata assertio Torturæ Torti* [R. Bellarmini] pro antistite Eliensi [L. Andrewees], auctore S. Collino. Cantabrigiæ, 1612.

² BB. g. 1, 2 (C. k. 8, 9). Colonia Agrippinæ, 1571.

³ DD. k. 26. *Philippi Ecclesiæ Eystettensis xxxix. episcopi de eiusdem ecclesiæ divis iscleribus commentarius nunc primum divulgatus, una cum duobus observationum libris et catalogo historico omnium episcoporum Eystettensium*, editore et auctore Iacobo Gretsero. Ingolstadii, 1617.

⁴ DD. ii. 61 (DD. l. 14). *Chronicon chronicorum ecclesiastico-politicum . . .* Collectore Johanne Gualterio Belga [= Jacobo Grutero]. Francoforti, 1614.

⁵ DD. l. 15.

⁶ DD. k. 19. *Evangelicæ historiæ ex quatuor Evangelistis perpetuo tenore continuata narratio ex Ammonij Alexandrini fragmentis quibusdam, e Græco per Ottonmarum Luciniū versa . . . Gregorii Episcopi Nazianzeni miracula secundum Matheum, carmine Græco, cum translatione Latina. Parabolæ enigmata, &c.* Augustæ Vindelicorum, 1523; bound with several tracts, one of which has notes in Ussher's hand.

⁷ I suppose the second treatise here named is Whitaker's *Concio in 1 Thess.*, F. 12. 4°. Cantab., 1599. The *Praelectiones de Ecclesia* were edited by J. Allenson. 4°. Camb., 1599.

6. *Hungaria querela advers. Jesuitas defens.*¹
6. Sixtini Amamæ censura vulgat. version : pentateuch.²
7. { Cancellaria Hispanica
Nic. Fulleri Lib. 5. et 6^{tes}
et Apologia contra J. Drusium³
8. Sam. Ward gratia discriminans.
9. { Procop. Gazæus in Reg. et Paralipom. græcol.
Jo. Meursij divinor. L.⁴
10. Nic. Fulleri Miscellanea Lib. 1. 2. 3. et 4^{tes}⁵
26. Bior Gual. Hacorah⁶

F 5.

2. Bernard : Sonius de Scriptura⁷
17. Roman : Eccles. Cardinal. nomenclatur. et Epitaphia Ducent.⁸
25. Ludovic. Careri Epist. ad Judæos

¹ DD. o. 18 is a volume of eight tracts, the majority of which have to do with the Jesuit Order. The first is entitled: *Querelarum inclyti regni Hungariæ adversus corruptelas Jesuiticas Augustæ Windelicorum recusas defensio* . . . 1620. Of the second, which is probably the work here named, it appears that only the sub-title, *Querela Hungaria*, remains.

² CC. f. 35. *Censura Vulgata atque a Tridentinis canonisata versionis quinque librorum Moysis*. Franekeræ Frisiorum, 1620.

³ DD. ii. 53. Volume containing two tracts, viz.: (1) *Cancellaria Hispanica. Adjecta sunt acta publica* . . . *Adjecti sunt sub finem Flores Scopiani, ex classico belli sacri*. Freistadii, 1622. (2) Nicolai Fulleri *Miscellaneorum sacrorum libri duo, quintus et sextus*. . . . *Accedit eiusdem Apologia contra*. . . *Johannem Drusium*. Lugduni Batavorum, 1622.

⁴ CC. ee. 31. Volume containing two tracts, viz.: (1) *Procopii Gazæi in libros Regum et Paralipomenon scholia*. Joannes Meursius . . . edidit . . . Lugduni Batavorum, 1620. (2) Ioannis Meursii *Variorum divinorum liber unus* Lugduni Batavorum, 1619.

⁵ CC. g. 51. *Libri tres plurimarum observationum in hac editione insigni auctario locupletati. His insuper accessit . . . liber item quartus antehac nunquam pervulgatus* . . . Oxoniæ, 1616.

⁶ CC. g. 32. Venetiis. An. Jud. 305 [= A.D. 1545]. The first words of the title, here oddly transliterated, are ביאור על דתיהרר.

⁷ BB. hh. 25. *Theologica disputationes de verbo Dei seu de Scriptura sacra in academia Montalbanensi agitata* . . . D. Bernardo Sonio . . . præsido. Genevæ, 1614.

⁸ DD. e. 3. *Nomenclator sanctæ ecclesiæ cardinalium qui ab anno millesimo quippiam commentati sunt* . . . *Accesserunt ad calicem pontificum et cardinalium epitaphia supra ducenta, quæ Alphonsi Ciaconi libro de pontificum gestis apposite interseri operæ est*. Tolossæ, 1614.

- 31. Testament Æthiop.¹
- 34. Bibl. Latin
- 35. Bibl. Latin.

fol. 10 v.

- 36. Bibl. Latin.

G 1.

- 17. Melchior. Cani Loci Theolog.²

G 2.

- Constantini Donatio Sylvestro.
- Othonis donatio Sylvestro
- 2. Abram Scultet confutatio Baronij de Baptismo Constantin.
- Ioan. Christmanni de Pasch. tempore
- Quirini Reuteri Oratio ad Palatinum³
- 14. Eccles. Cathol. in Anglia Concert contra Calvin[. . .].
- 22. Tho. Cartwright in proverb.⁴

G 3.

- 1. Isaaci Casauboni Epist ad Front. Ducæum
- 20. Roberti Parkeri Politicæ Eccles. Lib. 3⁵
- 21. Gul. Fulk. in Apocalyp.
- 22. Tho Brightman in Apocalyp.

¹ The editio princeps of the Ethiopic New Testament. Rome, 1648. Subsequent editions were later than our list. See Gregory, *Prolegomena to Tischendorf's N.T.*, iii. 898. The copy in the T.C.D. Library (EE. gg. 63), was acquired in 1840.

² E. ff. 4. *De locis theologicis libri duodecim.* Salmanticæ, 1663.

³ DD. kk. 36. Volume of five tracts, viz.: (1) *Constantini M. Imp. donatio Sylvestro Papæ Rom. inscripta . . . item Otthonis III. Imp. donatio Sylvestro II. Papæ facta . . .* Typis Gotthardi Voegolini. (2) *Confutatio prolizæ disputationis Cesaris Baronii . . .* Neostadii, 1607. (3) *Computus Græcorum de solennitate Paschatis celebranda ab Isaaco Argyro monacho ante annos ducentos & quadraginta editus . . .* auctore M. Iacobo Christmanno. Typis Gotthardi Voegolini. (4) *Jubilæus primus collegii sapientiæ quod est Heidelbergæ celebratus sereniss. Electore Palatino Friderico IV. . . .* summis aliis viris præsentibus in *Academia panegyri perorante* D. Quirino Reutero . . . 1606. (5) *Decennalia . . . Friderico V. . . dicata sive oratio eucharistica . . .* in illustri collegio sapientiæ recitata a Davide Felice Quirino Reutero . . . 1606.

⁴ CC. gg. 25 (B. k. 8). Lugduni Batavorum, 1617.

⁵ BB. kk. 44. *De politia ecclesiastica Christi et hierarchica opposita libri tres . . .* Francofurti, 1616. Opposite the words "Admonitio I. R. ad lectorem" is the note, apparently in Ussher's hand, "Jo. Robinsoni Brownistæ."

24. Andreae Eudæm. Joh. refut. Casaubon :
 30. Erhardi Winheim Agrippinæ Sacrarium et Peregrinat Roman :¹
 32. Andreae Riveti critici sacri specimen.²

G 4.

18. Codex Canonum Eccles. Rom.³

G 5.

1. { Martin. Helvicus de 7. (sic) hebdomad. Dan.
 Joa. Steuberi Disp. de voce Elohim
 Christoph. Helvicus de Chald. Bibl. Paraphr.⁴
 8. { Basilij }
 Gregorij } Lyturg. Latin. ex Arab. a Scialach
 Cyrilli }
 Ja. Gretseri admonitio de Bibl Tigurin.⁵
 12. { Theodor. Poltan. interpret: catenæ græc. in proverb.
 Georg. (sic) Thaumaturgi metaphras. græcol. in Ecclesiastic.
 Mic. Pselli paraphr. in Cantic.⁶
 13. David. Parei Colleg. theolog. et chronolog. sacra.⁷
 16. Aubert. Miræus de Episc. Christian.⁸
 21. { Optati Milevitan. de schismat. Donatist.
 Victoris Vticensis Lib. 3 de Persecutio. Vandilica.⁹
 23. Donatti Rork. Hibern. resurg. contra Dempster.¹⁰

¹ (G. m. 16) (G. n. 64). *Sacrarium Agrippinæ, hoc est, designatio ecclesiarum Colonienſium: præcipuum reliquiarum: quarundam itidem antiquitatum memorabilem unacum peregrinatione quam uocant Romana, coronidis loco adiuncta . . .* Colonisæ, 1607. ² CC. gg. 56. Dordrecht, 1619.

³ CC. ii. 22. Lutetiæ Parisiorum, 1609.

⁴ BB. k. 14. The three tracts in this volume are dated, respectively, 1624, 1624, 1612.

⁵ i.e. *de Bibliis Tigurinis*.

⁶ BB. l. 35. Antverpiæ, 1614.

⁷ CC. mm. 32. Volume containing two tracts by D. Pareus, viz.: (1) *Collegiorum theologicorum, quibus universa theologia orthodoxa et omnes prope theologorum controversiæ perspicue et varie explicantur, decuria una*. Heidelbergæ, 1611. (2) *Synopsis chronologiæ sacræ vindicata a Sethi Calvisii cavillis*. Francoforti, 1607.

⁸ BB. m. 43. *Notitia episcopatum orbis christiani . . . libri V*. Antverpiæ, 1613.

⁹ DD. m. 60. *Delibatio Africanæ historiæ ecclesiasticæ sive Optati Milevitani libri vii ad Parmenianum de schismate Donatistarum, Victoris Uticensis libri iii de persecutione Vandilica in Africa. Cum annotationibus ex Fr. Balduini I. C. commentariis rerum ecclesiasticarum*. Parisiis, 1569.

¹⁰ BB. o. 16. *Hibernia resurgens sive refrigerium antidotale adversus morsum serpentis antiqui . . . auctore Donato Rork Hiberno*. Colonisæ Agrippinæ, 1621. Opposite the pseudonym of the author, Usaher (?) writes "Davide Rooth."

37. *Balthasar Lydij Waldensie To. 2^{da} 1*

44. Rog. Widdrington resp. ad apolog. pro iure Principum 2

H 1. 8^{vo}9. { Eusebij hist. Eccles. Lib. 9. et Constant. Vitæ Lib. 5.
Ruffini historia Eccles. Lib. 211. { Jacobi Apost. } Liturgia.
Basilij
Chrysostomi }12. Joan. a Bosco Bibliotheca Floriacens.³13. Alfons. a Castro de Potestat. Leg. pœn. Lib. 2⁴14. Judoc : Ravesteyn Tilet. Apolog : pro Conc. Triden. adversus
Chemnitium pars prima.18. Jo. Filesaci opera⁵20. Abram. Sculteti annal. Decas 2^{da} 6

H 2.

13. Gregor. Nysseni græcolat. de homin. opif.⁷25. { Cælij Sedulij Paschale opus
Juvenci presbyteri carmin. de hist. Evangel.⁸

H 3.

23. Gul. Barret ius Regis⁹

H 4.

¹ *Waldensium Tomus ii cum schediasmatibus Balthasar Lydii.* Dordraci, 1617.² CC. nn. 13 (H. n. 15). *Responsio apologetica ad libellum cuiusdam doctoris theologi, qui eius pro iure principum apologiam tanquam fidei catholicae aperte repugnantem . . . criminatur.* Cosmopoli Apud Pratum, 1612.³ DD. m. 40. *Floriacensis vetus bibliotheca Benedictina, sancta, apostolica, pontificia, caesarea, regia, Franco-Gallica.* Lugduni, 1605. Marginal notes in Ussher's hand.⁴ EE. II. 5. *De potestate legis penalis libri duo.* Lugduni, 1556.⁵ CC. ii. 3. Parisiis, 1621.⁶ DD. I. 58. *Abrahami Sculteti Annalium evangelii passim per Europam decimo quinto salutis partæ seculo renovati Decas secunda, ab anno 1526 ad annum 1536.* Heidelbergæ, 1620.⁷ BB. m. 20. *Gregorii Nysseni De hominis opificio* interprete Johanne Lewenklaio . . . Basilis.⁸ BB. I. 39. Basilis, 1641.⁹ DD. p. 48. Basilis, 1612.

Fourth List.¹—fol. 11.

Recensio Librorum facta
Feb: 18^o 1639.²

Desunt in A 1.

1 }
2 } D^r Boate
3 }
4 }
5 }

Deest in A 3.

6 my Lord³

Deest in B 1.

11 my L⁴

Desunt in B 2.

1

15

Desunt in B 3.

4

5

6 (?)

10

13

14 M^r Puttock vt Antea

Desunt in B 4.

2

14

15 Hebr: Arabic. Psalter. Hebr.
[Arab.]

Desunt in C 1.

6

7 my L⁴

8

13

Desunt in C 2.

1

15 my L⁴

Deest in C 3.

15

Desunt in C 4.

10

11 M^r Fullerton vt antea

Desunt in D 2.

11

13 Hebr. Kimchi in Psal.

18 antea

Deest in D 3.

18

Desunt in D 4.

1

2 } removed

3 } sepher Mitsuothe⁴

10 } sepher Rabboth

Desunt in E 1.

2

Hebr. Concord. Hebraicograec.

3

Hebr. Eiusdem pars secunda.

8

21

Desunt in E 2.

2

17

18

19

21 } M^r Puttock vt antea

23

Desunt in E 3.

10

12 } M^r Puttock vt antea

17

24

25

26

Desunt in E 4.

12

17 Potkini Psalt. Æthiopicum

¹ The handwriting again changes. This list was written by the same person as the first.

² New style, 1640.

³ Probably Ussher himself. See below, p. 241, note ¹, and p. 260, note ⁴.

⁴ (BB. e. 7). *Expositiones in legem et quinque Megilloth; cum commentario R. Isaacar Behr f. Naphtali sacerdotis* כהנה נפתלי i.e. *dona sacerdotalia*

12	Deest in E 5.	17	Deest in G 1.
	Desunt in F 1.		Deest in G 2.
3	L ^d of Ardagh vt ant:	14	Desunt in G 3.
4		1	antea
8	Syriaca Nomenclatura Ferarij	21	} M ^r Arl: vssher vt antea
16	Erpenij editio Syriacolat. [Psalter.	22	
21		24	
	Desunt in F 2.	30	
2		32	
3			Deest in G 4.
19	M ^r Puttock vt antea	18	Desunt in G 5.
23		8	
	Desunt in F 3.	9	D ^r Donallan
4		11	
6		12	
8		13	
14		15	my L ^d
18	M ^r Fullerton vt antea	23	
19			Desunt in H 1.
	Desunt in F 4.	5	M ^r Fitz Gerald vt antea
3		8	
7		11(?)	
8	antea	13	
9		14	
10		18	my L ^d
26		21	
33	M ^r Fullerton vt antea		Deest in H 2.
	Desunt in F 5.	25	
2			Deest in H 3.
17		23	
25			
29			
30			
31	Test. Æthiop.		

90.¹

dicto. Cracov. A. 347 [A.D. 1587]. This title is taken from the Trinity College Catalogue of printed books. It describes two treatises bound in one volume. Our list seems to imply that they were bound separately.

¹ This figure, which in the manuscript is written at the bottom right-hand corner of fol. 11, indicates the number of missing volumes recorded on the page. The total number mentioned is 101, from which must be deducted 2, marked as "removed" (doubtless to another place in the library), 3 which have been crossed out, and 6 credited to "my Lord," which, if "my Lord" was the owner of the collection, would not be reckoned as missing. $101 - 2 - 3 - 6 = 90$.

Fol. 11 v.		Desunt in K 1.	
	Deest in H 4.	10	
4		11	
		12	
	Desunt in H 5.	15	
2			Desunt in K 2.
7		6	
9		15	
10		27	
11		29	
16			Desunt in K 3.
19		2	
25		6 antea	
	Desunt in I 1.	16	
1	antea	17	} M ^r Hamond vt antea
2		19	
14	antea	24	
20	my L ^d	32	
21		35	
31			Desunt in K 4.
32		7	
35		21 antea	
	Desunt in I 2.		Desunt in L 2.
30		1	
33		2	
49		3	M ^r Nugent vt antea
	Desunt in I 3.	5	
5		8	
6		15	
16	M ^r James Nugent vt antea	17	
19			Desunt in L 3.
34		10	
	Desunt in I 4.	[.] ²	
3		14	
21	antea	16	
35		20	
	Desunt in I 5.	21	
9	B ^p of Cloyn vt antea ¹	22	
10		27	
11			
12	Heb. remoued		

¹ See above, p. 220, note ⁷.² Number crossed out.

Desunt in L 4.	Desunt in O 1.
13	4
14	8
15	9 my L ^d
Desunt in M 1.	12 M ^r Gilbert ²
3 my L ^d	
6	Desunt in O 2.
7	3
13	4
14	17
16	
19	Desunt in O 3.
Desunt in M 2.	5
3	7 antea
4	8
9	11
10 } M ^r Price ¹	12
11 }	13
12 }	16 } antea
16 }	18 }
Desunt in M 3.	
10	Desunt in P 1.
11	1
12	5
13	14
14	22
15	
Desunt in N 1.	Desunt in P 2.
9	10
14	16
Deest in N 2.	
19	Desunt in P 3.
Desunt in N 3.	5
1	7
2	9
4 M ^r Puttock vt antea	
11 Dunkin vt antea	14 Heb. remoude (<i>sic</i>)
14 M ^r Travers	17
15	18
16	34

¹ This may have been Dr. John Price, who seems to have been held in esteem by Ussher (*Works*, xvi., p. 90), and corresponded with him (*ib.*, pp. 63, 253, 261, 531), or more probably Thomas Price, who was a Fellow of Trinity College when Bedell was Provost (*ib.*, p. 499). He subsequently became Archbishop of Cashel. See *Dublin University Calendar* for 1877, vol. ii., p. 195.

² A letter from Dr. William Gilbert to Ussher, dated Dublin, Dec. 11, 1638, is preserved, *Works*, xvi., p. 41.

Desunt in **Q 1.**

1
3
7
10
24 antea
27
30
32

Deest in **Q 2**

2
33

Desunt in **Q 3.**

16
17
19
22
32

Desunt in **R 2.**

1 L^d of Kilnemeka
2
3
4
19
21
22
30 M^r Gilbert

Desunt in **R 3.**

9
16
18
30 M^r Gilbert

Desunt in **R 4.**

5
6
7 M^r Jones vt antea
15
17
20
21
22
25

Desunt in **S 1.**

1
6

Desunt in **S 2.**

1
18
19 antea
25

Desunt in **S 3.**

9 my L^d
17
25
27

Desunt in **S 4.**

2
21

Desunt in **T 2.**

1
9
10
13
14
15
25
34

Desunt in **T 3.**

2
3 M^r Gilbert
6 M^r Gilbert
8
12 M^r Gilbert
15 M^r Gilbert
18 M^r Jones vt antea
22 my L^d
25

Desunt in **T 4.**

1
2
3
9
14
19 } M^r Arland vssher vt antea
20
30

Desunt in T 5.	Desunt in A 5.
3 the Colledge	1
18	15
Desunt in V 2.	16
2	
3	Desunt in B 5.
7	7
8	8
36	9
Desunt in V 3.	10
1	Desunt in C 5.
2	1
8 L ^d of Ardagh.	2
14	10
17	11
40 M ^r Jones vt antea	17
	18
Desunt in V 4.	19
29 M ^r Gilbert	
31	Desunt in D 5.
32	10
34	11
36	13
39	
46	
Deest in V 5.	
11	
Quære de C. 3. 14	202 ¹

fol. 12.

Bookes wantinge not in y^e Catalogue:—

R. 1. 7. M^r Gilbert
 B. 5. 8. M^r Nugent
 F. 3. 13. } M^r Nugent
 F. 4. 36. }
 I.² 2. 35. S^r Joh. Clotworthy
 R. 1. 10. D^r Arthure.

¹ Apparently intended to indicate the number of missing books (cf. p. 241, note): but, if so, the compiler of the list has made a mistake. The true number for this page is 238 - 2 "removed" - 6 crossed out - 5 marked "my Lord" - 1 doubtful = 222. Thus the total number of volumes missing from the library in Feb. 1648, including those mentioned in the appendix (fol. 12), was 90 + 222 + 6 = 318.

² Qy. F.

The last three of these lists enumerate books which were not in their places on the shelves of some library, at the date at which they were drawn up. Moreover, as we might expect, they all refer to the same library. This is proved by the circumstance that, notwithstanding some differences,¹ the same volumes are usually indicated by the same press-marks in all three, and by the fact that, in both the third and fourth lists, reference is made to the first as the "prior recensio."² Probably the first list also has to do with this library, and if so its position in Metcalf's note-book appears to indicate that it is of earlier date than the others.³ It must be observed, however, that it gives each of the first eight presses (A-H), six shelves, while according to the remaining lists, they had no more than five. Similarly, the number of shelves in O, P, Q is diminished by one; while, on the other hand, in I, K, L we observe an increase of one. What the purpose of the first list may have been, is not clear. Possibly—but I do not think this is likely—it is, like its fellows, a catalogue of missing volumes. It does not appear to merit further consideration.

We now turn our whole attention to the second, third, and fourth lists. In connexion with these, the first question which arises is: What was the Library to which they belonged, and of which they give us, in fact, a fragmentary catalogue? There is only one way of answering this question satisfactorily. We must examine as many as possible of the volumes named in the lists, and learn from them their history. But how is this to be done? Let me describe the method which I have followed.

In the first place I assumed that the lists refer to an Irish Library, and, that being so, that the Library in question must be either that of Trinity College, which had attained considerable proportions in the first half of the seventeenth century, or the collection of Archbishop James Ussher. Whether these assumptions were at the time justifiable I do not care to discuss. That they were sufficiently correct

¹ See A. 1. 3; C. 3. 4; E. 5. 23; F. 5. 17 (P see second list at E. 5. 17).

² See, in the third list, F. 1. 3; F. 3. 13, 18; and in the fourth, D. 3. 14; C. 4. 11; D. 2. 18; E. 2. 19, 21; E. 3. 10, 12; F. 1. 3; F. 2. 19; F. 3. 18; F. 4. 8, 33; G. 3. 1, 21, 22; H. 1. 5; I. 1. 1, 14; I. 4. 21; I. 5. 9; K. 3. 17, 19; K. 4. 21; L. 2. 3; N. 3. 4, 11; O. 3. 7, 16, 18; Q. 1. 24; R. 4. 7; S. 2. 19; T. 3. 18; T. 4. 19, 20; T. 5. 3; V. 3. 8, 40.

³ As telling in favour of the first of these suppositions, but somewhat against the second, is the fact that the first and fourth lists are in the same hand.

will, if I mistake not, be demonstrated by the result of my researches. Now, it is well known that these two collections were combined after the Restoration, to form the nucleus of the present Library of Trinity College. Accordingly, if any considerable number of the volumes specified in our lists can be recovered, the natural place to look for them is that Library. I discovered that many volumes there preserved answer exactly to the descriptions in our lists, and their press-marks are recorded in the foot-notes on the preceding pages.

But this was not enough. For our purpose it is necessary, not only to have in our hands volumes which suit the descriptions in the lists, but to be assured that they are actually the same volumes as those which were contained in the library whose history we are investigating, and not merely other copies of the same editions. This assurance we can evidently have in two cases. If the volume now in Trinity College has early press-marks, and if one of these be the same as the press-mark of a book with the same title, as given in our lists, there can be no doubt that the volumes which, but for this indication might be regarded as two, are not two but one.¹ Again, if the volume is a collection of tracts, published independently, but bound together by their owner, we need not hesitate, even in the absence of early library marks, to come to the same conclusion.² It is highly improbable that two collectors would, in any instance, choose exactly the same set of treatises to be brought together in a single volume.

On these principles it would be possible to identify, among the Trinity College books, some of the volumes enumerated in our lists. With the aid of the seventeenth-century manuscript catalogues of printed books, the number can be considerably increased. But neither the manner in which this can be accomplished, nor the table which I am now about to present, of all the volumes in the lists which I have been able to identify with practical certainty, can be understood without a few remarks on the catalogues just mentioned, and one other now lost.

To begin with the latter. The way in which our lists of missing books was prepared is manifest. The librarian went over the shelves, noting the press-marks of such volumes as were not in their places. He then turned to a local catalogue of the library to ascertain their

¹ This holds good of the volumes in the following table, numbered 6, 8, 9, 10, 13, 20, 26, 28, 31, 36, 38, 39, 41, 47, 59, 60, 62, 63, 65; in all 19.

² See numbers 26, 30, 32, 35, 54, 57, 58, 68, 71, 72, 73; in all 11. Compare also No. 1.

titles. That this local catalogue existed, that it was used in this way, and that it was far from complete, is proved by several references to it in the lists.¹ We shall designate it by the letter A. Of course nothing can be ascertained about it except what our lists reveal.

Setting aside the catalogue marked E. 4. 13,² which is useless for our purpose, since it gives no press-marks, and, for the most part, does not accurately define editions, we turn to the T. C. D. MS., D. 1. 5. This is a local catalogue, and is described in the recently issued Printed Catalogue of Manuscripts,³ and on the back of the volume, as a catalogue of Ussher's Library. It has two distinct systems of press-marks. Usually the place of a book in the library is indicated by a capital letter (occasionally a double letter), followed by two numerals, evidently denoting respectively the press, the shelf, and the position of the volume in the shelf. But, less frequently, the press-mark is a small letter followed by a single numeral. This catalogue I call B.

We next notice two volumes, which stand side by side, D. 1. 3, 4. These are described in the new Catalogue,⁴ which is in agreement with the lettering on the back, as being respectively the "Catalogue of Ussher's Library as given to T. C. D. in 1666," and the "Catalogue of Library T. C. D. 1664." Nevertheless, it is manifest to anyone who compares a few pages in the two volumes, that they are catalogues of the same library. D. 1. 3 is the basis of D. 1. 4, and from it the latter was almost certainly, in the first instance, copied. In the transcript a few corrections were made in cases where the earlier writer had deviated from strict alphabetical order, and a few entries were omitted. But later on many additions were made, and the insertions appear wherever space could be found for them, in complete defiance of alphabetical arrangement. Hence it comes that this catalogue is

¹ See in the third list at C. 1. 6, 8, and the appendix to the fourth list; and compare the absence of titles in the second list at L. 1. 3, 4, 9, 13, 15, 16, 18; S. 1. 5; T. 1. 15.

² No. 3 in the new Catalogue of Manuscripts. There is also in the MS. D. 3. 20 (No. 790) a list, in Ussher's hand, of "books bought by me in England a^d 1606," followed by other lists, also in his hand, headed "S^r James Fullarton," "Christopher Ussher," and "D. Chaloner." These lists might have thrown light on the history of the Libraries with which we are concerned, had I known of them before the present paper was printed.

³ No. 4.

⁴ Nos. 6, 5. The statements of the printed Catalogue are taken from earlier written Catalogues, and do not necessarily express the opinions of its compiler. Preface, p. vii.

very difficult to use, and I have seldom consulted it. As before, the press-mark is a letter followed by two Arabic numerals. I represent the pair by the letter C.

To our next group the letter D may be assigned. It has three members: D. 3. 6; D. 1. 2, and D. 1. 18. These are described in the new Catalogue¹ (in the case of the first with a note expressing doubt), as Catalogues of T. C. D. Library in 1610. The third is lettered on the back, "Challoner's Catalogue." Here we have a new system of press-marks. To the title of each volume is affixed a letter (either H or T) and three numerals. I suppose the letters H and T signify the two faculties of Humanity and Theology, but I have not thought it worth while to verify my guess with any care. The numerals, no doubt, indicate the press, shelf, and position of the volume: the presses being separately numbered in the two divisions of the library. Of these volumes I take D. 1. 18 to be the earliest, as the number of articles in it is much smaller than in either of the others. D. 3. 6 and D. 1. 2 follow one another page by page, and to a slight extent, line by line, one being evidently copied from the other. I believe D. 1. 2² is the later of the two, and, as it is the easier to use, I have confined myself to it.

I must return to these catalogues. Meanwhile, what has been said will suffice to enable me to explain the use made of them in the following table. In the first column I have placed the press-marks of the volumes in our lists (Catalogue A), in the second, third, and fourth columns, the corresponding press-marks in B, C, D. The fifth column gives the press-marks, late and early, found in volumes of the same titles and editions in the Trinity College Library. The latest change in the press-marks was made not a century ago. As the Library increased, the pressure on the available space became serious. Accordingly, the benches which formerly stood in the stalls were removed, and book-cases were put in their place. At the same time, the tables which had stood opposite to them were got rid of, and it thus became possible to add extra shelves to the original book-cases. When this was done, it became necessary to alter the symbols by which the shelves were indicated. Thus, for example, the volume BB. 15. 26, apparently without changing its place, became BB. ff. 26. I have indicated these two marks in the table together—thus: BB. 15 (ff). 26. And, similar cases have been dealt with on the same principle.

¹ Nos. 2, 1, 358.

² In this opinion I am glad to find myself in agreement with Dr. Abbott. See his note in the Catalogue of Manuscripts, p. 1.

TABLE

Of the Volumes mentioned in the above Lists, which can with reasonable certainty be identified in Trinity College Library.

A	B	C	D	Press-marks of volume in T.C.D.
1. A. 2. 8. 9. { [11, 14. {			T. 3. 1. 1 &c. (Par. [1589).	BB. cc. 8, 9, 11, 14. ¹ (Colon. Agr. 1618.)
2. A. 5. 1. {			T. 11. 4. 12, 13.	C. 4 (d) 16 C. 6 (f). 22. T. 11. 4. 15.
3. B. 2. 15. {		P. 1. 4.	T. 2. 8. 8.	G. 3 (c). 31 G. a. 21. G. 10 (n). 37. ² T. 2. 8. 8.
4. B. 3. 8.	A. 2. 10.	B. 2. 18.		{ BB. dd. 19. B. 2. 18. A. 2. 10.
5. B. 5. 8.		G. 4. 10.		{ CC. d. 34. G. 4. 10.
6. C. 1. 13.				{ CC. 3 (c). 21. C. 1. 3. ³
7. C. 2. 1.		F. 8. 5.		{ AA (BB). 4 (aa). 14. GG. 2. 14. F. 8. 5.
8. [C. 2. 2.] ⁴		F. 8. 6.		{ AA (BB). 4 (aa). 15. AA. 2. 24. F. 8. 6. C. 2. 2.
9. [C. 2. 3.] ⁴		F. 8. 7.		{ AA (BB). 4 (aa). 16. AA. 2. 5. F. 8. 7. C. 2. 3.
9a. C. 2. 4.		B. 2. 17.	T. 1. 4. 23. ⁵	{ C. 16 (dd). 3. ⁶ T. 1. 3. 23.

¹ These volumes are divided in such a way as to agree exactly with the description in the second list.

² See above, p. 228, note ⁵.

³ It may be assumed that either the press-mark recorded in the first column or the old mark in the volume is erroneous.

⁴ These volumes are not mentioned in the lists, but it is natural to infer that they were in A, and that their press-marks were as stated. They are the second and third volumes of the work, of which C. 2. 1 is the first.

⁵ *Corr. e* T. 1. 3. 23.

⁶ See below, p. 251, note ².

TABLE of the Volumes mentioned in First, Second, and Third Lists—
continued:—

A	B	C	D	Press-marks of volumes in T.C.D.
10. C. 2. 9.	F. 3. 57.	D. 1. 16.		{ DD. 3 (c). 21. D. 1. 16. F. 3. 57. C. 2. 9.
11. C. 5. 12. }	M. 2. 5.	I. 7. 6.	T. 12. 5. 6.	{ CC. 14 (bb). 16. M. 2. 5. H. 5 (e). 12.
11a. C. 5. 19.			T. 8. 1. 15. ¹	{ B. 15 (cc). 14. ² T. 8. 1. 15.
12. D. 2. 11.	O. 2. 10.	D. 2. 2.		{ BB. 22 (nn). 4. D. 2. 2. O. 2. 10.
13. D. 2. 17.		Q. 1. 17.		{ DD. 2 (b). 32. HH. 2. 5. D (f). 2. 17.
14. D. 5. 13.	F. 4. 55.	B. 5. 17.		{ AA (BB). 5 (bb). 24. F. 4. 55.
15. D. 5. 21.	N. 1. 69.	D. 11. 6.		{ BB. d. 30. N. 1. 69.
16. D. 5. 22.	M. 2. 26.	D. 6. 2.		{ DD. 4 (d). 10. D. 6. 2. M. 2. 26.
17. E. 1. 2.		A. 2. 25.	T. 1. 1. 7.	{ AA (CC). 6 (f). 16. A. 2. 25.
18. E. 1. 3.			T. 1. 1. 8.	{ CC. f. 17. ³ A. 5. 12.

¹ The date given in D (1589) is incorrect.² Next to this volume stands B. 15 (cc). 13, Tolet's Commentary on St. Luke (Paris, 1600), which has the old press-mark, T. 8. 1. 14 (as in D). I have mentioned B. cc. 14, not because it seems likely to be identical with our C. 5. 19, but merely because of its early press-mark, which, as we shall see, is really an argument *against* the identification. For this reason it is not numbered in the regular series.³ The old press-marks in this and the preceding volume (the first and second parts of the same work) show that they became parted from one another in the older library with which they came to Trinity College. Taken in connexion with the absence of the second from C, this points to the conclusion that whoever borrowed the two volumes only returned the first, and that its companion did not find its way back till after C had been compiled. In this connexion it should be noticed that it was probably not yet in the Trinity College Library when the change in the press-marks mentioned on p. 249 was made. For its shelf is denoted by a *letter*, not, as in the case of the first part, by a *letter and a number*.

TABLE of the Volumes mentioned in First, Second, and Third Lists—
continued :—

A	B	C	D	Press-marks of volumes in T.C.D.
19. E. 1. 4. }	B. 5. 60.	D. 3. 3.		{ CC. e. 16. D. 3. 3. CC. 7 (i). 7. B. 5. 60. H. 7. 14. X.
20. E. 1. 21.		C. 4. 17(P).		{ DD. e. 14. KK. 37. E. 1. 21.
21. E. 2. 2.		D. 2. 6.		{ BB. 22 (nn). 19. D. 2. 6.
22. E. 2. 3. }		D. 4. 12.	H. 7. 1. 30.	{ DD. k. 34. D. 4. 12. M. f. 13. H. 7 (P). 1. 30.
23. E. 2. 17.	L. 5. 31.	F. 5. 2.		{ AA (CC). 11 (ee). 45. F. 5. 2. L. 5. 31.
24. E. 2. 18.	L. 3. 44(P).	F. 5. 3.		{ CC. ee. 46. AA. 11. 46. F. 5. 3 (P). L. 3. 44.
25. E. 2. 28.		B. 4. 16.		{ BB. 6 (i). 10. B. 4. 16.
25a. E. 3. 12.			T. 6. 2. 37.	{ B. 7 (k). 12. T. 6. 2. 37.
26. E. 3. 16. ¹		H. 2. 24.		{ DD. 10 (o). 32. H. 2. 24. E. 3. 16.
27. E. 3. 17.	L. 4. 19.	H. 2. 2.		{ BB. 19 (kk). 4. H. 2. 2. L. 4. 19.
28. E. 3. 20.		H. 4. 7 (P).		{ BB. 18 (ii). 16. H. 2. 22. E. 3. 20.
29. E. 3. 24.	L. 1. 29.	H. 2. 19.		{ CC. 6 (P) (l). 11. H. 2. 19. L. 1. 29.
30. E. 3. 25. ¹				B. 7 (k). 14.

¹ A volume of tracts.

TABLE of the Volumes mentioned in First, Second, and Third Lists—
continued:—

A	B	C	D	Press-marks of volume in T.C.D.
31. E. 4. 6.		M. 1. 22.		{ EE. 3 (f). 17. M. 1. 22. E. 4. 6.
32. E. 4. 10. ¹		H. 3. 7 (f).		{ CC. 5 (e). 35. BB. 5. 35.
33. E. 4. 17.	O. 4. 26.	A. 3. 15.		{ A (C). 6 (f). 10 A. 3. 15. O. 4. 26.
34. E. 4. 21.		G. 7. 11.		{ BB. 17 (hh). 5. G. 7. 11.
35. E. 4. 22. ¹		A. 4. 28.		{ AA (CC). 7 (g). 47. A. 4. 28.
36. E. 4. 26.	n. 26.	C. 3. 24.		{ CC. 19 (kk). 16. C. 3. 24. n. 26. E. 4. 26.
37. E. 5. 16.	O. 4. 26.	A. 3. 15.		{ AA (CC). 6 (f). 10. A. 3. 15. O. 4. 16. ²
38. F. 1. 4.	F. 4. 42. ³	F. 6. 15		{ AA (CC). 11 (ee). 17. F. 6. 15. F. 4. 42. F. 1. 4.
39. F. 1. 14.	b. 64.	D. 3. 4.		{ DD. 5 (e). 41. D. 3. 4. b. 64. F. 1. 14.
40. F. 1. 15.		C. 4. 10.		{ DD. k. 37. C. 4. 10.
41. F. 1. 16.		A. 2. 19.		{ AA (CC). 7 (g). 14. A. 2. 19. F. 1. 16 (f). A. 11.

¹ A volume of tracts.² Either this number, or the corresponding one in B seems to be incorrect.³ Incorrectly dated in B, 1624. The words "Tomus primus" are interlined. It is thus shown that when B was drawn up, the second volume was not in the library. These words are not in A, from which a similar inference may be drawn. Next to this volume now stands t. ii with the press-marks, AA (CC). 11 (ee). 18; F. 6. 16. In B: F. 4. 43 is assigned to another book.

TABLE of the Volumes mentioned in First, Second, and Third Lists—
continued :—

A	B	C	D	Press-marks of volume in T.C.D.
42. F. 1. 20.	L. 3. 54.	K. 1. 13.	T. 10. 5. 9.	{ CC. 16 (dd). 38. K. 1. 13. L. 3. 54. E. 19 (gg). 41. T. 10. 5. 9.
43. F. 2. 23.	D. 2. 7.	K. 8. 2.		{ DD. 9 (?) (n). 7. K. 8. 2. D. 2. 7.
43a. F. 3. 6.		C. 11. 20, 21.	T. 10. 1. 8, 9 (?).	{ C. 7 (k). 8, 9. BB. 4 (g). 1, 2.
44 F. 3. 8.		C. 3. 12. ¹		{ DD. 6 (k). 26. C. 3. 22.
45. F. 3. 14.		O. 7. 7.		{ DD. ii. 61. DD. 1. 14. O. 7. 7.
46. F. 3. 15.		O. 7. 8.		{ DD. 1. 15. O. 7. 8.
47. [F. 3. 16.]	C. 1. 14.	P. 2. 14.		{ DD. 1. 14. DD. 18 (ii). 61. P. 2. 14. C. 1. 14. F. 3. 16. ²
48. F. 3. 18.		G. 1. 18.		{ CC. ee. 41. G. 1. 18.
49. F. 4. 1.	O. 5. 34.	D. 6. 13.		{ DD. 6 (k). 19. O. 5. 34. 1. 186. 44. C. 44.
50. F. 4. 7. ³		O. 7. 36.		DD. 18 (ii). 53.
51. F. 4. 8.	C. 2. 55.			{ CC. 7 (k). 45. C. 2. 55.

¹ Either this mark, or the corresponding mark in the book itself, is apparently erroneous.

² If this book was in A, as the press-marks seem to prove, it was a duplicate of F. 3. 14. In that case, F. 3. 17 may have been the corresponding duplicate of F. 3. 15. But, if so, it had disappeared before C was written, since in it, as in the present T. C. D. Library, only the first volume of the work is duplicated. The fact that there is a second copy of vol. i. is, no doubt, the cause of the strange confusion in the later press-marks.

³ A volume of tracts.

TABLE of the Volumes mentioned in First, Second, and Third Lists—
continued :—

A	B	C	D	Press-marks of volume in T.C.D.
52. F. 4. 9. ¹		B. 7. 23.		AA (CC). 11 (ee). 31.
53. F. 4. 33. }	F. 5. 55.	H. 9. 9.		{ DD. 10 (o). 62. H. 9. 9. F. 5. 55. H. ? (h). 33. T. 10. 7. 19.
54. G. 2. 2. ¹		O. 8. 15.		DD. k. 36.
54a. G. 3. 30. }			T. 11. 2. 24.	{ G. 9 (m). 16. T. 11. 2. 24. G. n. 64.
55. G. 4. 7.		L. 2. 8.		{ CC. l. 61. L. 2. 8.
56. G. 4. 18.		K. 1. 25.		{ CC. ii. 22. K. 1. 25.
57. G. 5. 1. ¹				BB. 7 (k). 14.
58. G. 5. 13. ¹		E. 6. 15.		CC. mm. 32.
59. G. 5. 15.	A. 8. 47.	B. 4. 36.		{ BB. 16 (gg). 38. A. 8. 47. C. 5. 15. ²
60. G. 5. 21.	A. 7. 31.	D. 6. 22.		{ DD. 8 (m). 60. A. 7. 31. G. 5. 21.
61. G. 5. 23.	K. 4. 27.			{ BB. 11 (o). 16. K. 4. 27.
62. H. 1. 12.		E. 3. 16.		{ DD. 8 (m). 40. E. 3. 16. H. 1. 12.
63. H. 1. 18.		D. 3. 15.		{ CC. 18 (ii). 3. D. 3. 15. H. 1. 18.
64. H. 1. 20.		D. 4. 23.		{ DD. 7 (l). 59. D. 4. 23 (t).

¹ A volume of tracts.² In the case of this remarkable volume there has plainly been confusion, owing to the similarity of the letters C and G. It is reported in the second list as missing "of old." Probably all the time it was in the Library, having been placed at C. 5. 15 instead of G. 5. 15. Compare above, No. 6.

TABLE of the Volumes mentioned in First, Second, and Third Lists—
continued :—

A	B	C	D	Press-marks of volumes in T.C.D.
65. H. 2. 13.	B. 8. 12.	K. 3. 27.		{ BB. 9 (m). 20. K. 3. 27. B. 8. 12. H. 2. 13.
66. H. 3. 23.	N. 5. 29.	I. 10. 34.		{ DD. 11 (p). 48. N. 5. 29.
67. N. 1. 9.	B. 2. 42.	G. 4. 18.		{ CC. d. 32. G. 4. 18. B. 2. 42.
68. I. 3. 18. ¹		G. 2. 17.		BB. 9 (m). 2.
69. O. 3. 9.		F. 7. 15.		{ BB. bb. 14. F. 7. 15.
70. P. 2. 6.		O. 4. 13.		{ EE. 1 (a). 12. O. 4. 13.
71. R. 2. 19. ¹		Q. 7. 5.		EE. 7 (k). 56.
72. R. 4. 7. ¹		K. 2. 20.		{ BB. o. 35. BB. 11. 65. K. 2. 20.
73. S. 2. 26. ¹				DD. 6 (hh). 56.
74. T. 3. 18.	G. 6. 5.	R. 6. 29.		{ EE. ii. 61. M. 2. 21. G. 6. 5.
75. T. 5. 3.		K. 3. 5.		{ BB. 19. (kk). 31. K. 3. 5.
76. U. 4. 46.		O. 2. 8.	H. 8. 4. 9.	{ DD. 18 (ii). 63. O. 2. 8.

An examination of this table brings to light two facts which are important for our investigation. The first of these is that A, B, and C are catalogues of the same Library, and that the library which they represent is now incorporated with the T. C. D. Library. This, I believe, can be demonstrated. In nineteen cases out of the seventy-six enumerated, it is proved by the old press-marks that a volume registered in B is registered also in C.² In fourteen cases it is similarly

¹ A volume of tracts.² See Nos. 4, 10, 12, 16, 23, 24, 27, 29, 33, 36, 37, 38, 39, 42, 43, 47, 53, 65, 67.

shown that a volume is common to A and C,¹ and in eight that a volume is common to A and B,² while six volumes are registered in all three catalogues.³ All these books are now in Trinity College. So also are fifteen volumes named in A which are not proved by the press-marks to have been in B or C.⁴ To the conclusion which seems to follow of necessity from these premises I conceive that only one objection is possible. Assuming the correctness of our inference, and that the proper chronological order of the catalogues is A, B, C,⁵ we should expect that a volume included in A, and still preserved in the Trinity College Library, would be mentioned in B and C. And in like manner, a volume in B ought also to have a place in C. But in fact we find that, in many instances, our table does not prove that this is so. To take a concrete case, No. 26 was certainly in A and C, why then if B is a catalogue of the same collection is its press-mark absent from our second column? In other words, we have to account for the blank spaces in our second and third columns. This can be done without difficulty. In the third column there are only nine blanks of the kind mentioned. We may suppose that the writer of C accidentally omitted to register the volumes, or that he described them in such a way that I have not been able to identify them, or finally, that they had been borrowed after catalogue B was prepared, and were not returned till after C had been drawn up. In the second column the blanks are much more numerous, but this was to be expected. B is a local, not an alphabetical, catalogue. It is, therefore, impossible to find a volume in it unless its press-mark is known beforehand. And, the press-marks can only be ascertained, apart from the catalogues, if they are preserved in the volumes recorded in our fifth column. Now, the majority of these volumes have been re-bound, and in the process of binding, old marks are in great danger of being destroyed. Actually in the case of the press-marks given in B, this danger is much greater than in the case of those given in C, although many of the latter have been lost. In the first place, the B marks are older than the C marks, and between the two, as we shall see, there came an interval during

¹ Nos. 7, 8, 9, 10, 26, 31, 35, 36, 38, 39, 41, 47, 62, 63, 65.

² Nos. 10, 36, 38, 39, 47, 59, 60, 65.

³ Nos. 10, 36, 38, 39, 47, 65.

⁴ Nos. 1, 6, 13, 20, 28, 30, 32, 50, 52, 54, 57, 58, 68, 71, 73.

⁵ Proof will be given of the truth of this assumption lower down. But, of course, a similar objection may be raised on any supposition as to the order of the catalogues in time, provided either B or C is later than A.

which the library possibly suffered much from neglect, and from its many journeys from place to place. But this is not all. The C marks were usually inscribed in two places—on one of the fly-leaves, and on the front of the volume, across the edges of the pages. The B marks on the other hand, were entered, in most cases, on the fly-leaves only. And experience proves that it was just in that place that they were least likely to survive the ordeals of mis-use and re-binding. Thus the objection which has been stated is satisfactorily disposed of. We may rest assured that A, B, and C refer to the same library. This library suffered losses, and it received accessions; it was more than once re-arranged, but the bulk of the books remained through all its vicissitudes.

This being assumed, we can now draw a further inference. A volume in the present library may have lost its A press-mark, and yet we may be confident that it was actually in the library which A represents. Thus, for instance, No. 4 in the table retains the marks of B and C. We conclude at once that it was in A, though the A press-mark is gone. The only other possible supposition is, that when A was written the library had a copy of the book, that this copy was subsequently lost, and that another copy was procured to take its place in the interval between the compilation of A and B. That this happened, in a large number of instances, is highly improbable. It is considerations such as these which justify us in including Nos. 4, 5, 7, 8, 9, 11, 12, 14, 15, 16, 17, 19, 21, 22, 23, 24, 25, 27, 29, 33, 34, 37, 40, 42, 43, 44, 45, 46, 48, 49, 51, 53, 55, 56, 61, 64, 66, 67, 69, 70, 72, 74, 75, 76, in our table.

But again. Most of the volumes, which we have succeeded in identifying, are now kept in the cases marked BB, CC, DD. Now many other volumes in these presses answer to the descriptions of volumes given in A, as may be seen from a glance at the foot-notes on pp. 218-239. The presumption clearly is, that the bulk of these volumes also belonged to the library catalogued in A, B, C, though we are precluded from dogmatising in any individual case.

But we must now state the second conclusion which our table seems clearly to warrant. It is this: that the library, of which D is a catalogue, was a collection completely distinct from the A, B, C library. In no more than fourteen instances does D record a volume with the same title as one of those in our first column. In no single case in which a volume in col. 4 is proved to be identical with one in col. 5 is that volume shown to be identical with one mentioned in

cols. 1-3. In some cases there is what almost amounts to proof,¹ in others presumption,² to the contrary. Now D certainly represents the original library of Trinity College. The oldest member of the group is the MS. No. 358 (= D. 1. 18), lettered on the back, "Challoner's Catalogue," and said to be in his hand. It is not likely to belong to any other library than that which Challoner himself helped to collect.³ The latest member, again, is No. 1 (= D. 1. 2), a note on a fly-leaf of which expressly informs us that it is a Catalogue of the "old Library"⁴ of Trinity College. This collection, of course, forms part of the present Library.

Thus the present T. C. D. Library contains two distinct collections of early date, the original College Library (D) and that represented by A, B, C. Now, the only considerable collection known to have been added to the Trinity College Library, in the seventeenth century, was that of Archbishop Ussher. It is difficult to evade the inference that it was the collection to which our Lists, as well as the Catalogues A, B, C refer.

Opinions will differ as to the degree in which this argument amounts to a demonstration. But it is supported by several considerations, the combined force of which is, I think, irresistible.

In the first place, most of the identified volumes mentioned in the lists are now, as has been observed, in the presses BB, CC, DD. But in these presses, according to the tradition of the Library, Ussher's books are preserved.

Again, very many of these volumes have notes in Ussher's hand,⁵ and at least two bear his arms on the cover.⁶ And, in accordance with this fact, we have a direct statement, as to one volume, that it was "in Primate Ussher's Library,"⁷ while, in the case of another, the assertion that it was "lent at the Colledge"⁸ implies that it was

¹ Nos. 1, 22, 42.

² Nos. 2, 3, 54a. In these instances the present library has two copies of the work, one is proved to be identical with that which is indicated under D, the other is probably identical with that which appears under A. Compare No. 11.

³ *The Book of Trinity College*, p. 147 sq.

⁴ Compare MS. 9 (= E. 4. 8), a Catalogue of the "New Library."

⁵ Nos. 20, 49, 61, 62, 76. So also E. 1. 21; E. 3. 26; E. 4. 12; F. 4. 1; G. 3. 20; G. 5. 15, 23; H. 1. 12; I. 1. 39; K. 3. 6, in the lists.

⁶ Nos. 24, 43. Also a book which stands next to No. 24, and which retains its C press-mark (F. 3. 3), and probably others.

⁷ No. 19. See above, p. 219, note ¹⁰, and further below, p. 263.

⁸ No. 75 = T. 5. 3 in second and fourth lists.

not in the College Library. Moreover, the second list is in Ussher's writing, and the borrowers of books, whose names are recorded in it and in the fourth list were, for the most part, either relations or personal friends of the Archbishop.¹

And lastly, the date of at least one of the lists fits in with what is known of his life at the period. In September, 1635, he writes to Dr. Ward,² complaining of his weariness after attendance at Parliament, at the memorable Convocation of that year, and at the Divinity Acts and Summer Commencements at Trinity College. "I am now at last," he adds, "retired from Dublin to my old place, where I begin at length, redire in gratiam cum veteribus amicis." With his "old friends," no doubt, he continued in peace for some time, and we are not surprised to find that he made a list of such of them as were missing five months latter, Feb. 20, 1634. But more remarkable is the occasion to which we may refer the fourth list. Ussher preached before the Irish Parliament in March, 1634. "Immediately after," Dr. Elrington tells us,³ "he went over to England with his family, intending to remain for a considerable time, in order to pursue his literary labours in London and Oxford"—as it proved, never to return. It was natural that before starting upon his journey, he should cause a "recension" of his library to be made: the fourth list is dated Feb. 18, 1634. It is not in the Primate's hand. But we know that at the time his chaplain, Dr. Nicholas Bernard, was acting as his librarian.⁴ By him, therefore, in all probability, the list was penned.⁵

We must now return to our catalogues. The question is an obvious one—How came it that the press-marks in these catalogues are all different? In order to find an answer to this question, we must endeavour, in the first place, to fix as closely as possible the dates of the catalogues B and C.

It is easily shown that both B and C are later than A. The A press-marks have a line drawn through them in Nos. 36, 39, 59, to

¹ See Notes on second and fourth lists.

² *Works*, xvi., p. 9.

³ *Works*, i., p. 207.

⁴ *Ib.*, p. 231, note 2, quoting Bernard's *Life*, p. 94.

⁵ A conjecture which is made more probable if I rightly understand "My Lord," in the fourth list, as indicating Archbishop Ussher. Ussher undertook his journey to England, no doubt, with a view to the researches necessary for his *Dissertation* on Ignatius and Polycarp, which appeared four years later. It is significant, therefore, that G. 5. 15 is one of the eleven books marked "my Lord." See above, p. 221, note 14. Only two others can be identified—C. 1. 7, and H. 1. 18, in the third list.

make way for B press-marks, in Nos. 8, 31, 63, to make way for C press-marks. It appears further, that C is later than B, for in Nos. 42, 74 the B press-mark is struck out in favour of the C press-mark. And we have evidence that additions were made to the collection in the interval between the writing of B and C.¹ B, therefore, dates from a time when A had ceased to be in use. That is to say, it is subsequent to the date of our fourth list—Feb. 1648. And, C is still later. I do not know on what basis the date (1620) given for B in the Catalogue of Manuscripts rests, but if I have reasoned correctly, it is certainly too early by at least twenty years. The two manuscripts comprised under C (No. 5 = D. 1. 4 and No. 6 = D. 1. 3) are described in the Catalogue as respectively the Catalogue of the Trinity College Library in 1664 and the Catalogue of Ussher's Library, as given to Trinity College, Dublin, in 1666 (written in 1667). With the latter description and date I have no quarrel. In 1661, a committee of three persons was appointed by the Irish House of Commons to transfer Ussher's Library, then at Dublin Castle, to Trinity College, and to draw up a Catalogue of it.² The Commons, in a rash moment, further ordered that the catalogue, when completed, was to be inserted in the Journal of the House, an order which, as we might expect, does not appear to have been obeyed. It appears probable that there was some delay in transferring the books, and that Trinity College did not receive them till 1666.³ There seems to be nothing to hinder us from believing that MS. D. 1. 3 is the very catalogue prepared after the arrival of the books, in compliance with the order of the Commons. But if so, both the description and the date of its fellow must be incorrect. I have already shown that D. 1. 4 is copied from D. 1. 3. The copy was made not later than 1669—the year of the death of John Stearne, one of the Restoration Fellows, whose name appears on a fly-leaf. I am inclined to suppose that, D. 1. 3 having been prepared for presentation to the House of Commons, a transcript (D. 1. 4) was immediately afterwards made from it for the use of readers in the Library. The date of C may

¹ See p. 253, note ³ (No. 38).

² *Book of Trinity College*, p. 150; Stokes, *Worthies of the Irish Church*, p. 26 sq. When I wrote, in the latter place, that it was not known whether the Catalogue had been made, I was not aware of the existence of the two manuscripts now under discussion.

³ This I infer from the statement in Browne's *Catalogue*, quoted by Abbott, *Book of Trinity College*, p. 151.

then be assumed to be 1666–1669, and it may be taken to represent Ussher's Library after it had been deposited in Trinity College. There it was kept, apart from the original College Library,¹ till both were housed in the present building (finished in 1732), when the books were, of course, once more rearranged, and were deposited in the cases AA–DD, where, for the most part, they still remain.

The Catalogue B has still to be accounted for. Its limits of date are, as we have seen, 1641–1666. During that period the fortunes of Ussher's Library were various. It was removed from Drogheda, where it was within a little of being destroyed during the siege of 1641, to Chester. This was in the summer of 1641. By 1643, if not earlier, it had found its way to Chelsea College, and was in that year confiscated by the House of Commons. The greater part of it, however, was subsequently restored to its owner.² Where it was for the next few years I do not know: but Ussher and his books can have been seldom together at that period. From 1642 till the beginning of 1645, the Archbishop was at Oxford, working at his treatise on the Ignatian Epistles.³ In the spring of 1645 he went to Cardiff, taking with him some chests of books.⁴ A few months later he was obliged to leave Cardiff, and went on a visit to Lady Stradling, at St. Donat's, Glamorganshire, losing some of his books *en route*.⁵ In June, 1646, he was again in London, at the house of the Dowager Countess of Peterborough.⁶ The conclusion to which a study of the history naturally leads cannot be better stated than in his own words:—"Externis istis bonis (quæ sppellantur) exutus sum omnibus: sola bibliotheca e flammis illis erepta, a qua ipsa tamen ad hunc usque diem etiam exulo." But scarcely were these words written, when he and his library were again together. In 1647, the Archbishop was appointed preacher at Lincoln's Inn, and apartments being assigned to him, his library—or what remained of it,—was removed to them.⁷ For eight years Ussher remained in poverty, but in comparative peace, at Lincoln's Inn. After his death, in 1656, the library was bought for Trinity College—but for some years it was detained in Dublin Castle, by order of Cromwell.⁸ Conflicting

¹ Dunton, *Life and Errors*, as quoted by Ingram, *The Library of Trinity College, Dublin*, London, 1886, p. 8.

² *Works of Ussher*, i., pp. 221, 231 sq.

³ *Ib.*, p. 227 sqq.

⁴ *Ib.*, p. 242.

⁵ *Ib.*, p. 243 sqq.

⁶ *Ib.*, p. 247.

⁷ So he writes in July, 1647, to John Gerard Voss. *Works*, xvi., p. 96. Cf. p. 69.

⁸ *Works*, p. 250.

⁹ *Ib.*, p. 302 sq. *Book of Trinity College*, p. 149.

accounts are given of its state during that period.¹ But the resolution of the House of Commons, already referred to, seems to imply that, however carefully disposed, a catalogue of it had not been made as late as 1661. During the whole troubled period, then, between 1641 and 1666, there seems only one interval to which catalogue B can be referred, the years 1647-1654, during which Ussher was at Lincoln's Inn. Special provision was there made for the housing of his books, and, no doubt, they were properly arranged under his own supervision. Thus it appears that A is the Drogheda Catalogue of Ussher's Library, 1625-1641, while B is the Lincoln's Inn Catalogue, 1647-1654, and C the Dublin Catalogue of the same library, 1666-1669.

There are two other matters, with reference to the connexion between Ussher's Library and that of Trinity College, on which it may be well to remark in bringing this paper to an end.

The first is suggested by the volume marked E. 1. 4 in the second list (No. 19 in the Table). This volume must plainly be identical with either CC. e. 16 or CC. i. 7 in the present Library. But, with which of them? For both were in Ussher's Library. And, how can we account for the note in the latter which plainly implies that it was in the College Library while Ussher's Library was still a distinct collection? The simplest answer to the latter question seems to be, that Ussher having two copies of the book, presented one to the newly formed library, and that that copy was CC. i. 7. If this be so, he must have sent his gift from England, towards the end of his life, since it is registered in B, but not in C. Both copies may have been in A and B, but which of them bore in the former the press-mark E. 1. 4 it is impossible to guess. This is not the only instance which we have noticed of a gift from the Primate to the Library of his College. H. h. 33 (No. 53), has an early press-mark, apparently of the College Library (though it is not in D), but it was once the property of Ussher, since his signature appears on its title page. This book was also a duplicate. The companion copy (DD. o. 62) is in both B and C: but which of the two had the press-mark F. 4. 33 in A we are again unable to decide.

Dr. Abbott² gives reason for believing that Ussher's collection of manuscripts suffered less than has been supposed from theft, in the interval between the Archbishop's death and its acquisition by Trinity College. And he drops a hint³ that the same may be true

¹ *Book of Trinity College*, p. 150.

² *Ib.*, p. 151.

³ *Ib.*, p. 150.

of the printed books. Do our lists throw any light on this question? I think they do. If the third and fourth lists are compared, it will be found that, in A-H 3, some eighty-four volumes, described with sufficient accuracy for identification, were missing immediately before their owner left Ireland for the last time. Let the proverbial character of book-borrowers be remembered, and not less the horrors of 1641, and the reader will probably wonder whether any of these books ever came into Ussher's hands again. The fact is that a very large proportion of them are at this day on the shelves of the Trinity College Library. No less than thirty-one appear in our table, and to these twenty-six are to be added, which can be identified with probability. There are thus no more than twenty-seven still missing. And, of these, eleven were already absent (nine of them absent "of old" ¹) from their places in Feb. 1634. Of the remainder some may be in the Library, though I cannot be sure that I have found them.² The inference surely is, that very few indeed of those which were recovered by the Archbishop failed to reach the ultimate destination of his library.³

¹ Of which as many as five are laid to the account of Mr. Puttock.

² *E.g.* F. 1. 8; G. 1. 17; G. 3. 30; H. 1. 13.

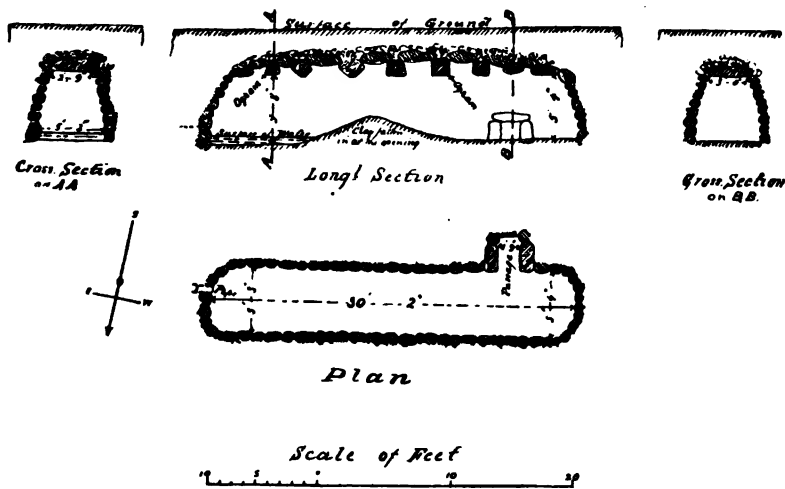
³ Dr. Abbott (*Book of Trinity College*, p. 150) quotes an interesting contemporary document, from which we learn that in Nov., 1659, the Commissioners of Parliament for the Government of Ireland ordered "the Trustees for Trinity College", and others, "to take into consideration . . . a Paper delivered by Dr. Jones [Query, Ussher's nephew: see above, p. 226, note ²], concerning the publishing of some part of the said [Ussher's] Library or manuscripts, and of recovering some part of the said library being at present abroad in some men's hands, albeit they ought to have been returned hither with the Books as were purchased," &c. This statement deserves attention. It helps to account for the fact that so many of the volumes lent by Ussher to his friends before 1641, were ultimately restored to his library; and it leads us to expect that Catalogue C may contain the titles of many books not named in B—thus confirming a suggestion which has been made in an earlier part of this Paper, above, p. 257.

XV.

REPORT ON THE OGAMS RECENTLY DISCOVERED NEAR
CONNOR, CO. ANTRIM. BY REV. G. R. BUICK, LL.D.

[Read JUNE 25, 1900.]

THE Committee appointed by the Academy to investigate these Ogams carried out the work entrusted to them last summer. It consisted of Professor Rhys, the Rev. W. P. Carmody, A.B., the discoverer of the inscriptions, and the Rev. Dr. Buick. They were accompanied by Messrs. Robert Cochrane, C.E., P. M. C. Kermode, and S. K. Kirker, C.E. The owner of the farm on which the inscribed stones are, Mr. Wm. Hyndman, also attended, and with his sons rendered assistance.



L.N.K.

Souterrain at Carncoombe, Co. Antrim, showing position of Stones with Ogams.

The stones themselves belong to the roof of a "cave," or souterrain, which lies on the ridge of a low hill in the townland of Carncomb, about half a mile to the south-east of the village of Connor. From the appearance of the ground round about the souterrain those present came to the conclusion that originally it belonged to a rath. It runs

almost due east and west, and consists of a single chamber, 30 feet 2 inches long, a little over 5 feet in breadth, and from 5 to 6 feet high. It is built of unhewn stones, as such structures almost always are, each successive course reaching farther towards the interior than the one immediately below it, until at the top the average breadth is about 3 feet. The roof is composed of nine large stones, from 4 to 5 feet long, laid so that they are from 1 to 2 feet, or more, apart. The spaces, so formed, are each filled in turn with three or four shorter stones, laid at right angles to the larger ones, and of course resting upon them, whilst the openings left by these latter are carefully closed by still smaller stones. As will be seen from the plan (page 265) kindly furnished by Mr. Kirker, the souterrain itself is not dumbbell-shaped, as is elsewhere stated, but of the same average breadth throughout. Near the west end, and on the south side, there is a well-constructed passage, or opening, 9 inches high by about the same in width. This seems to have been the original entrance to the cave.

The first thing done was to have the covering soil entirely removed. The two upper layers of stones were then lifted, and "the principals" left bare. The inscriptions being on two of these largest stones—the last but one at each end—both were carefully taken up, so that the legends, which were turned downwards, *i.e.* towards the interior of the souterrain, could be thoroughly examined in broad daylight.

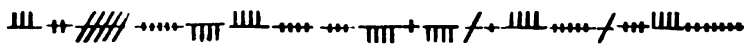
The one at the west end was found to be the larger of the two, being a little over 4 feet in length. After examination it was put back again into its place, and the stones that formerly covered it also replaced. The other was found to be badly cracked, and as it was considered inadvisable to run the risk of having it broken by the superincumbent weight, it was not restored to its position, a substitute for it being found in the immediate neighbourhood. At present Mr. Hyndman has the care of it, but it would be advisable for the Academy to have it removed as soon as possible to the Museum in Dublin.

Both stones are basaltic, as are almost all the local stones.

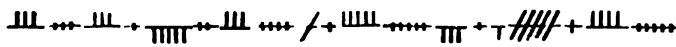
The inscription on stone No. 1, *i.e.* the one at the west end, is 2 feet in length; that on stone No. 2, the one at the east end, occupies a space of 14 inches. The letters, in both instances, are unusually small and badly formed. The average length of most of the consonants is three-fourths of an inch. Others, however, run up to an inch, and a few, such as Rs and Ms, to a couple of inches. All of them look as if they had been scored in with a nail. Even in the sunlight it was

difficult to make some of them out. A few defied all attempts to decipher them. These last belonged to stone No. 2, the arris of which had been much rubbed down, but whether in the souterrain or before the stone was put in its place it is impossible to say. Probably the latter supposition is nearer the truth.

Those present spent a long time over the examination of the scores, and the general conclusion arrived at was that the legend on stone No. 1—the longer of the two—reads—


 T O R A E S C E U S A S M A Q U I M U C O I
 M E U T I N I,

and that on stone No. 2—


 T U T A N O T E M A Q I V A B R A C I

Mr. Kermode, of Ramsay, Isle of Man, who has given much attention to Ogams, writing afterwards of the inscriptions, says:—

“I find my final reading of the smaller stone set down without any doubt as follows:—

‘Tutanote maqi Vabraci.’

With the longer one there was no difficulty about the first three characters. Then followed five points, which of course may stand for *AE*, as suggested, I think, by Dr. Buick. The next two are clear, and are followed according to my first reading (taken down by Professor Rhys), by eight points, but I see I corrected this to seven points, making *u*, *v*. This is followed without any hesitation by *SASMAQI*.

“Then I appear, on first reading, to have lost the places and omitted *m*, *v*, continuing with *c* and five points, and then two points, which, however, I afterwards took down as two points, and then five—not *i*, *o*, but *o*, *i*. The next character, *m*, is clear, but I seem again to have got confused over the vowel points, which I note as five, but afterwards correct to seven, making *e*, *u*. The rest is clear, *TINI*.”

Professor Rhys sends the following, which throws a flood of light on the inscriptions, and shows at the same time the great importance of the investigation:—

“With regard to the Connor ogams, I was much struck by the minuteness of the writing and the shallowness of the scoring, which

The name is there treated mostly as *Meuthi* in the nominative and genitive, but sometimes we have *Meuthius*, genitive *Meuthii*, and ablative *Meuthio*. The *th* is the Irish rule-right mutation from the *t* which we have in *Meutini*; but whether the latter form is to be regarded as the genitive of a form *Meuti*, or as the genitive of a derivative from *Meuti* appears doubtful. It is certain, however, that *Meutini* is closely connected with that of the Goidel Meuthi who baptized and educated St. Cadoc in South Wales. Now we come to the name of the man commemorated on the stone; but what was it? *Toraescusas* is like no personal name that I have ever come across, and one cannot help supposing that we have here two words which have to be separated; but where is the separation to be made? At any rate the prevailing formula would suggest that the termination *as* is that of the genitive case, corresponding to the *is* of such Latin forms as *noctis*, *Veneris*, and the like, and it is natural to suppose that the first vocable in *Toraescusas* means mound, monument, or tombstone, and is the noun which governs the other in the genitive. To await a better solution I venture to analyse the whole into *Toraes Ceusas*, and see what can be made of them. Now there was an Irish word *tuir*, which meant a pillar or prop, and metaphorically a lord or chief. Stokes, in his *Urkeltischer Sprachschatz*, gives it the meaning of 'tower,' and considers it cognate with the Latin *turris*; for he does not think it the Latin word borrowed on account of its single *r*. On the whole I am inclined, however, to take the contrary view and to regard both *tuir* and the Welsh *tur*, 'a tower,' which has only a single *r*, as borrowed from the Latin, though I cannot explain the phonology. In fact I would further suggest that *toraes* is simply *turris*, borrowed and treated as *tores*, while *e* is loosely represented by *ae*. In that case one might render the whole into Latin as *Monumentum Ceusis filii Generis Meutini*. But let us see what can be made of *Ceusas*: now if this is genitive as I have supposed, the dative would have to be *Ceus-i*, and the nominative *Ceus-s*; but in Irish, as far back as one can trace it, the sibilant between two vowels represents *ss* whether so written or not, and at the end of a word it was dropped, but retained elsewhere; so the nominative would be reduced to *Ceu*, and the genitive, losing its case-termination would become *Ceus*. Now the name *Ceu* occurs but as a genitive, the correct genitive *Ceus* having, as I suppose, been forgotten. Another view is possible, namely that the medial *s* in this word was, from the beginning, a single or simple sibilant, but, according to rule, this disappeared early between vowels. In that case we should have not only nominative *Ceu* but also genitive *Ceu*; and that is the view

I should like to take, but I hesitate as our inscriptions have not hitherto been known to carry us back to such an early stratum of Goidelic speech. I must now give the three references which I have to *Ceu*: they belong to the pedigrees at the end of the Book of Leinster, namely folios 327^d, 381^c, 336^f. They occur in versions of the pedigree of the great Ulster hero, Fergus Mac Róig: the last, 336^f, contains the following sequence: M. Deatha, M. Ceu, M. Celebair, which at 331^c is M. Deffhatha, M. Ceu, M. Celebair, while at 327^d it is M. Deatha, M. Ercfhatha, M. Ceu, M. Hebair. So there seems to be no reason to suppose that the *c* of *Ceu* belongs to the preceding *maic*.

"Should this hypothesis be rejected, there are several others which might be tried. I will mention one—the full genitive may be *Esceusas*, formed from *ceusas* with the aid of the prefix *es* = *ex*, and then we should have left for the initial word *tora*, which may perhaps be taken as standing for *torra*, of the same meaning and origin as the Welsh word *twr*, 'a heap,' plural *tyrrau*, though *tora* looks feminine, and *twr* is masculine. The rendering would then be *Tumulus Esceusis filii Generis Meutini*. I must confess that I prefer the previous view, but I wish it to be clearly understood that it is brought forward merely as a hypothesis, and in the hope that somebody else will offer something more satisfactory. Till then also it is useless to guess the age of the inscription: it looks to me as though it might be one of the earliest we have, but I cannot say that this belief is independent of the hypothetical explanations which I have just indicated.

"The other inscription is even more difficult to read, but Dr. Buick has given it thus:—

III	----	||||	→	----	/	+	||||	----	+	||||	+	||||	→	----	----		
T	E	G	N	A	I	M	A	Q	U	I	A	V	A	R	A	T	I
C		M	S														C
		R															

My first guesses of the first name were T E D A N O T E: then I jotted
? s ? e

down the scorings as making *Tutanote*; but I had to give it up in despair. However, we were more successful with the second name, which was attacked by Mr. Kermodé, who was the first to perceive that it was

||||→T||||→||||→----

Vobraci. This seems to me quite certain, except the first vowel, which may possibly have been not *o* but *a*, but I hardly think so.

Thus the reading may be represented as *T. maqui Vobraci*, which may be rendered ‘(The monument) of T. son of Fobrach.’ For *Vobracc*—would in later Irish have to become either *Fobrach* or *Fobracc*, while the genitive of the former would be *Fobraich* or *Fobrich*, and the latter occurs in the Book of Leinster in the genealogy of Dál Corpri Arad, fol. 312^a.¹ This is not all, for an entry under the year 500 in the ‘Annals of Innisfallen’ (as published by Stokes in the *Revus Celtique*, xvij. 126) reads as follows: ‘K. uii. Mac[c]nissi .i. Aengus espoc Conddere quieuit, cuius pater Fobraech dictus est, cuius mater Cness ingen Comcaide de Dáil Ceterne, a qua nominatus est Mac Cneisse.’ In spite of the spelling *Fobraech*,² instead of the *Fobrach* or *Fobraich* to be expected, there seems to be no sufficient reason to dissociate it from *Fobrach*, and if *Fobraech* was the name of the Bishop of Connor’s father, or *Mac Nisse*, as he is commonly called, one is at liberty to suppose the man commemorated in our inscription to have been *Mac Nisse*’s brother. This would carry with it the approximate date of the inscription, for *Mac Nisse* died, according to the ‘Annals of Innisfallen,’ in the year 500: the ‘Chronicum Scotorum’ makes it 508, while the ‘Annals of Ulster’ have it under the year 513. It is very possible that the pedigree of the Bishop of Connor’s family still exists, and that the names of his brothers are given. In that case one might see whether any such bore a name which would fit into the Ogam, but I do not know where to search.

“More might be written on most of the points which I have touched upon, but as my remarks are chiefly intended to elicit criticism and fresh suggestions, I have endeavoured to avoid overloading them with details. I will only add, that I am convinced that where inscribed stones are found in the walls or roofs of subterranean chambers like the Connor one, the stones were stolen from burial grounds; and in the case of the *Vobraci* stone I notice that it had been long enough exposed to the weather or the tramp of feet to have its edge worn down to its present state of illegibility in the matter of the name with which the Ogam began.”

¹ In a passage, of the meaning of which I am not sure, we have (fol. 333^b) *Sord a quo Sordraige la Crimthannu. Is uadibside Episcopus Ibar for Fobrech.* What does *for Fobrech* exactly mean? *For* is abbreviated in the usual way *f̃*.

² The spelling *Fobraech* is most likely due to a misreading of an older spelling *Fobracc*, while the spelling *Fobracc* which occurs in a Lebar Brecc gloss on the mention of *Mac Nisse* on the 3rd of September in the Calendar of Oengus is probably due partly to *Fobraech* and partly to a wish to explain the name by introducing the adjective *brecc*, ‘speckled.’

XVI.

**SUPPOSED AUTOGRAPH LETTER OF BISHOP BERKELEY
IN THE LIBRARY OF THE ROYAL IRISH ACADEMY.
By SWIFT P. JOHNSTON, Professor of Moral Philosophy
in the University of Dublin.**

[COMMUNICATED BY THE REV. JOHN BERNARD, D.D.]

[Read NOVEMBER 12, 1900.]

AMONG the Academy MSS. a letter signed George Berkeley has hitherto generally been ascribed to the great Idealist, but certain recent investigations have thrown considerable doubt on the correctness of this assumption. To make the case clear let us start from the beginning.

George Berkeley, the metaphysician, entered Trinity College, Dublin, in 1700, at the age of fifteen. He worked his way through college, won his fellowship, and published his earlier essays. Then in 1713 he left Dublin, spent some years in travel on the Continent, lived some time in London, and returned to Ireland in 1721. Now the earliest biography of Berkeley, that of Bishop Stock, published in 1776, asserts that it was in the capacity of chaplain to the Lord Lieutenant, the Duke of Grafton, that Berkeley came back to Dublin. A contradiction of this statement as to the chaplaincy appeared almost immediately in a review of Stock's "Life" in the *Gentleman's Magazine*. Professor Fraser, in his biography of Berkeley, adopts Stock's assertion, and supports his opinion by quoting a letter signed George Berkeley that at the time Fraser saw it was in the possession of the late Mr. Malcolmson of Carlow. Hereafter I shall refer to this as the Carlow letter, while the one in the possession of this Society is briefly designated as the Academy letter.

The Carlow letter is as follows :—

From y^e Court of Ireland, October 6.

I thanke you for your kind letter, Deare Brother Nelson, though you and y^e postmaster did not agree in y^e date, ther being 20 days difference. This hath puzzled me a little as to y^e time of your housekeeping; but I hope you keepe your old quarters and are now settled at St. James to your content. I have bin a fortnight in y^e Castle: but excepting a little difference in y^e hangings of my chamber, and its

being seated upon y^e first story, I find Jack Hafe and George Berkeley are Brother Chaplains, and equally considered. We both rise at 6 o'clock, in our waiting week, to pray with y^e family. At 11 we give his Grace solemne Prayers, and at 9 after supper y^e bell rings againe. Besides ourselves, there is another Chaplaine who not living in y^e house, we are faine to rise for him and supply his turne in y^e morning. I have y^e honour to sit at y^e lower end of my Lds table (which is no great matter) as also to sup always with y^e Steward when I am not in waiting, and often dine there. But a good Deanery will easily make amends for y^e lessening my quality; though I could wish his Majesty had told me his mind of removing Church Preferment from y^e Commissioners before I came out of England. But as it is, God's will be done. My Ld Duke and I are at a great distance here, so not many wordes passe between us. He made me once a very low cringe at St. John's, but if he will stoope now to do me a reale kindnesse it will be much better. Thus you have a short account of my affairs. I never drunk or saw any usquebah since I came into Ireland, though I have bin at many tables and civilly used in a sober way without impoting: if anything material doth happen in my concern, I will send you word. In y^e meane while I am

Most affectionately

Your humble servant

GEORGE BERKELEY.

My kind love to your wife and y^e rest of your friends.

For Robert Nelson, Esq., at Berkeley House in St. John's Lane neare Smithfield, London.

So far we have mentioned as authorities, Bishop Stock, his reviewer, and Professor Fraser. Now comes Dr. Theodor Lorenz, a student of the history of philosophy, who is at present working at a life of Berkeley for German readers. When in Dublin last year, Dr. Lorenz visited the Academy and his attention was directed by Mr. M'Sweeny to the Academy letter.

The Academy letter runs thus:—

From y^e Castle of Dublin, Jan. 15.

I returne you many thanks for y^e kindnesse and obliging freedom of your letter. What will be my fate here, I can't tell. His Grace was pleased not long ago to show me some countenance at table, and send me some Florence wine being in a good humour, and another time

he asked for a plate and sent me a pluvver w^{ch} meat himself liked best, a favour (as I am told) he never imparted to any chaplaine before. And was not this (think you) worth coming into Ireland for, and enough to countervail y^e trouble of a voyage out of England and y^e extraordinary charges attending it? Besides the Archbishop of Dublin hath bin very kind to me & often invited me to dinner in consideration of y^e ranke that I sustaine as Chaplaine to y^e Great Lord Lieutenant, and my friendship with Dr. Needham (or Heedham) his old fellow Collegiet. My Ld of Tuam carried me 5 or 6 weeks agoe to y^e Lord Primate of Ireland, who made me this dry complement, that I came over with My Ld Lieutenant & therefore it was in vaine for him to promise me anything. But y^e greatest honnour of all was a personall visit from y^e Archbishop of Tuam (as his Grace assured me that he once did in my absence) & I have y^e charity to believe so Great a Prelate, because he used me with a great deale of Ceremony when I went to see him. These would be fine things to talke of, in this vaine world, if I were a meer novice and unacquainted with y^e impertinence of mankind. I wish ye Duke of Ormond doth not show himself a Courtier in y^e worse sense of all that after he hath levelled me with Common Clergymen, he doth not leave me where he found me; & so much y^e worse for coming into Ireland to seek a billet (?) & departing y^e same Country pastor as I came. But as I have no strong hopes of making my fortune here, so neither do I despaire: who am

your affectionate humble servant

GEORGE BERKELEY.

My service & kind love to your good wife.

For Robert Nelson, Esq., at his lodgings in St. James-street where y^e Lord Brunkard formerly lived, in London.

Struck by certain similarities between the two letters, Dr. Lorenz concluded that they must be closely connected in time. It is to be noted that in the dating of both letters, though the month and day of the month are given, the year is omitted. This affords an object lesson as to the importance of fully dating our letters; for had such been done in this case, no doubt or controversy could have arisen. Dr. Lorenz then began to question whether these letters were written by George Berkeley the philosopher; he ultimately arrived at a decisive negative. His principal arguments are two in number:

Both letters mention a duke as Lord Lieutenant, but it is in the Academy letter alone that the name appears, the Duke of Ormonde. Now in the early 1700's the vicerealty was on two occasions conferred

on a Duke of Ormonde. The first was the period 1703–1707. But at that time, Berkeley was still in Trinity College; in 1703 he was an undergraduate; and in 1707 he gained his Fellowship, while not until 1709 was he ordained. This period must therefore be excluded. Then again, from 1710 to 1713, a Duke of Ormonde represented the Crown in the Kingdom of Ireland. But during this period Berkeley could not write of himself as in both the Academy and the Carlow letters, that he had been brought out of England by his protector, for he was continuously resident in Dublin from 1700 to 1713. Moreover, to sustain the view of Stock and Fraser, that 1721 was the date of Berkeley's chaplaincy, the letters should have mentioned as the Lord Lieutenant, not the Duke of Ormonde, but the Duke of Grafton.

The other main argument of Dr. Lorenz is this. Both these letters are directed to Robert Nelson in London. The Carlow letter addresses him as "Deare Brother." Both letters refer to Nelson's wife. Who was Robert Nelson that Berkeley should call him brother? Dr. Lorenz's investigation in this direction has been most conclusive. The Lord Berkeley who died in 1698 had two sons and several daughters. One daughter was married in 1682 to Robert Nelson, "the pious Robert Nelson," the author of "The Life of Bishop Bull," and of "Festivals and Feasts," who died in 1715. The elder of Lord Berkeley's sons duly succeeded, in 1698, to the father's title. The younger son entered the Church, became a Prebendary of Westminster in 1687, died in 1694, and his name was—George Berkeley! By assuming that this George Berkeley wrote the Carlow and Academy letters all difficulties disappear. "Deare brother" is but a contraction of "dear brother-in-law." Nelson's wife is specially mentioned; she was the sister of this George Berkeley. The Duke of Ormonde is now the nobleman of that name who was Lord Lieutenant from 1677 to 1685. It may also be mentioned that Professor Fraser, in consequence of his 1721 theory, is forced to describe Robert Nelson as a son, purely hypothetical, of the "pious Robert Nelson."

So far Dr. Lorenz. In confirmation of his conclusion that these letters were not the composition of George Berkeley the philosopher, the following additional points may be advanced:—

The George Berkeley of the Academy letter speaks of himself as a "country pastor." Now in 1721, the date to which these letters must be assigned if written by the Idealist, Berkeley might possibly have described himself as a man of letters, he might have written himself down as a College don, but it would be absolutely impossible for him to assume for himself the character of a "country pastor." Nay

further, at no time of his life is such a designation appropriate. Only during those later years spent in Cloyne was he living in the country, and then it was not as a mere "country pastor," but as a bishop of the Church.

Both the Carlow and the Academy letters are the composition of one who was a stranger in Dublin. The reference in the Carlow letter to the drinking of usquebaugh is evidently that of a tourist reporting to a friend at home and correcting an impression generally prevalent as to the excessive fondness of the good people of Dublin for the "wine of the country." The writer is in fact in a position very similar to that of an American who recently visited Dublin. My friend from the other side expressed his surprise that notwithstanding all he had read in the papers about the disturbed state of Ireland and the daily outrages throughout the country, he nevertheless found Dublin as safe for the unarmed stranger as his native San Francisco. That George Berkeley the philosopher, after thirteen years' residence in Dublin, after the varied convivial experiences of a College undergraduate, after becoming a local celebrity through his books, and after mingling in the best of Dublin Society through the introduction of his friends, St. George Ash, Perceval, and the Molyneux family, that this George Berkeley should have penned the sentence about usquebaugh passes the bounds of credibility. Then, too, in the Academy letter consider the allusion to the Archbishop of Dublin: "He often invited me to dinner in consideration of y^r rank that I sustaine as Chaplaine of the Great Lord Lieutenant." If this letter were written in 1721, the Archbishop was the great William King, who throughout his life was in the closest possible contact with the life of Trinity College. Berkeley, if for no other reason than that he was a F.T.C.D., must have been well known to King. Besides, there was another notable bond of union between the two men. In 1707 there was a revival of the Dublin Society. The Society founded by William Molyneux in 1683 ceased to exist at the death of its founder in 1698. King, an active member of the original Society and a frequent contributor to its proceedings, took with Berkeley a prominent part in the revival. King was one of the chief officers of the new Society, while Berkeley was the most active member in the ranks. So it would be absurd to imagine William King extending hospitality to Berkeley on the ground that the latter was a member of the Vice-regal household.

The personality of the author of these two letters is not that of the George Berkeley with whom we are familiar. The letters were written by a place-hunting parson, by one who considered that he had

some claim on those in high positions, by a man who was a decided snob. He does not wish to be classed with common clergymen. He feels hurt at being seated at the lower end of the table. He takes it as an indignity that he should be compelled to sup with the steward. But to all he submits in the hopes of "a good deanery." How alien all this to the notoriously pure and noble character of Bishop Berkeley! He was the very antipodes of a snob. With his humble birth and his inner dignity, we never find him ascribing to social rank a higher value than that which truly belongs to it, that value which depends on the character of him who holds the rank. At one time, indeed, Berkeley was a place-hunter, but while the author of these letters sought preferment merely for the sake of ease and dignity, Bishop Berkeley rose far above such vulgar motives. At the very time at which these letters were written, if Prof. Fraser's theory be true, *i.e.* in 1721, Berkeley was seeking the deaneries of Dromore and Derry. He threw his whole energy into the contest. He was a place-hunter. But the underlying purpose was one of the noblest. It was at this time that his enthusiasm for missionary work was at its maximum. Just as in his later years at Cloyne, we find tar-water and its virtues percolating through every page of his writings, so for the years about 1720, the Bermudas loomed large in all his acts and words. His dominant idea was the spread of civilization. (It is worth noting, in passing, that Berkeley's missionary zeal was not of that kind which is rooted in religious bigotry—with him it was education, civilization, first—then religion would follow, as of course.) So the deanery he sought and won was but a stepping-stone towards the realization of this great purpose. As to the purity of Berkeley's motives, no more trustworthy testimony can be obtained than that of the cynical Dean of St. Patrick's. In his "giving of characters" Jonathan Swift was but too prone to exhibit the seamy side of even his best friends, yet in 1724 he writes thus of Berkeley: "He is an absolute philosopher with regard to money, titles, and power. . . . He showed me a little tract . . . his whole scheme of a life, academico-philosophical, of a college founded for Indian scholars and missionaries, where he most exorbitantly proposes a whole hundred pounds a-year for himself." The value of this testimony is enhanced in this way, that it was written shortly after the death of the unhappy Esther van Homrigh. She, by an alteration in her will just before death, left to Berkeley all that part of her wealth that had been originally intended for Dean Swift. We are forced into the conclusion that these two letters are inconsistent with the character of Bishop Berkeley.

Through the courtesy of those in authority in the Academy, I have been able to make a close comparison of the handwriting of the Academy letter, with the undoubtedly genuine MSS. of Bishop Berkeley in the Library of Trinity College. Although I do not aspire to the somewhat dubious distinction of an expert in handwriting, yet I have very considerable familiarity with MSS. of the period in question, and this is not in the first occasion on which I have been called on to decide as to the authorship of documents of the time. So it is with some confidence that I put forward my conviction that the letter in the possession of the Academy is not in the handwriting of Bishop Berkeley. The details on which my conclusion rests are not sufficiently interesting for publicity, and to be rendered intelligible would require a series of diagrams. Still there are two somewhat peculiar points to which I wish to refer. In the letter, the contraction, *y*^e is invariably written for *the*; in the College MSS. of Bishop Berkeley, this contraction does not occur. Then again, in both the Academy and the College MSS. the present form of the letter *e* as well as the ancient form are to be found. By the ancient form I mean, that which looks like a Greek *theta*, written on a small scale and with one continuous stroke of the pen. But though both forms occur, there is this curious difference, that in the bishop's writing, the ancient form is the rule and the modern is the exception, while in the Academy letter this relation is exactly reversed. With regard to the general character of the writing there is further this notable difference: Berkeley's writing is remarkably clear and precise. When once familiarity with the forms of the letters has been acquired, doubt never arises as to the words the bishop intended to record. This cannot be said of the Academy letter. It is but right that the element of weakness in this comparison should be specified. If the date of the letter be 1721 as Prof. Fraser's theory demands, it must be admitted that there is a considerable interval of time between the letter and the College MSS. These MSS. are the rough draft of the "Treatise on Human Knowledge" and two essays that I was fortunate enough to find among the Molyneux Papers. None of these specimens of Berkeley's writings are later than 1710, so there is an interval of at least eleven years, during which it is quite possible for changes to take place in the style of writing. Further, it is somewhat open to objection that we should base a conclusion, when in the Academy letter we have but a single page of writing as our specimen. Still I feel that I must adhere to what I have before asserted, that this letter is not written by Bishop Berkeley.

XVII.

REPORT ON THE ISLAND OGAM AT BRACKLAGHBOY,
NEAR BALLYHAUNIS. BY PROFESSOR RHYS.

[COMMUNICATED BY ROBERT COCHRANE, F.S.A.]

[Read NOVEMBER 13, 1899.]

On Monday, July 24, I joined Mr. Cochrane, Dr. Crean, and others in an attempt to explore the small mound on which stands the Island Ogam-stone; but my attention was devoted chiefly to the Ogam. I had not seen it before, but I had received a copy of it together with a rubbing from Mr. Cochrane, whose account of the Ogam proved most accurate. Unfortunately the edge has been damaged, apparently long ago, at two points, which will be readily understood by glancing at Mr. Cochrane's reduced rubbing:

This I read as follows :—



 C U N A L E G I A V E Q U U N A C A N O S

 E I C

It may, perhaps, be Englished, "Conlig descendant of Connacán"; but it is not to be concealed that the inscription offers several difficulties; and I would call attention at the outset to those of the reading. The first of them occurs in the case of the first vowel, for here the edge has been chipped, leaving only one notch, where there is room for three—possibly four. The latter would make *e* and the former *u*, which is, doubtless, the reading to be preferred, as the name occurs elsewhere, to wit at Drumloghan, in Co. Waterford, where we have the genitive as *Cunalegea*. The next difficulty occurs at the top of the stone where a piece of the edge is gone. This has carried with it the upper ends of the *v* scores and all the vowel-notches, also the base of the consonant following the vowel. The principal doubt is as to the vowel: there seems to be ample room for four or five notches, that is for *e* or *i*. Had there been consonant scores there, one might expect the ends of them to show, but I could detect no trace. So I would suggest *ave* or *avi*, but the latter is ruled out by the fact that *Cunalegi*

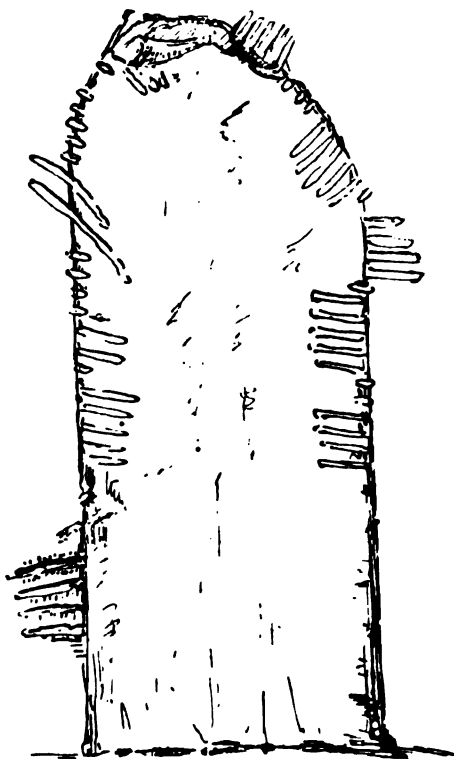
seems to be nominative for an earlier *Cunalegis*, while *avi* would be genitive, namely of the word which is in modern Irish *úa* or *ó*, genitive *úi*. One has, therefore, to fall back on *ave* as a nominative. We have the same spelling *ave* in one of the Drumloghan inscriptions,¹ and in Old-Irish it became *aue*. The early form is supposed to have been *avias*, but whether this became next *avia* or *aves* I cannot say, as the



data are wanting to show whether or not the silencing of the final *x* preceded the blending of *ia* into *e*: on the whole I should be disposed to regard the phonological sequence as—*avias*, *aves*, *ave*, *aue*, *úa*, *ó*. The last difficulty of the reading attaches to the initial consonant of the second name: is it to be read *Quunacanos* or *Cunacanos*? One

¹ See the Journal of the R. Soc. of Antiquaries of Ireland, 1899, pp. 395-7.

would naturally expect *Cunacanos* with the common element *cuna*, which we have in *Cunalegi* in this very inscription. Perhaps one might rule out the first score as somewhat irregular in its form, and reduce the number of scores to four, that is $\text{IIII } \sigma$; but I confess that I could not satisfy myself that the group is not IIII ; so I am driven to ask what the reason was for the five scores? By way of answer, one might possibly suppose the name to begin with a modification of the



word *quonna*-, 'head,' or else with one of the words for 'hound,' Mod. Irish *ch*, genitive *con*, some of the Aryan congeners of which appear to presuppose a *qu* rather than the *c* attested by both Irish and Welsh: in the latter the word for 'dog' is *ci*. I do not like either of these conjectures, and, on the whole, I prefer supposing the inscriber to have been careless enough to cut one score too many. I should, accordingly, read, not *Quunacanos* but *Qunacanos*, as merely an equivalent

of *Cunacanos*. For I have found no instance of *qu* and *c* being confounded in any Ogam of respectable antiquity. The reading would in that case be *Cunalegi ave Qunacanos*, meaning *Cunalegis nepos Cunacanūs*.

Further, there are difficulties attaching to the identification of the proper names. *Cunalegi* would probably be in later Irish *Conlig* or *Condlig*, of which the genitive seems to have been *Conlega*: the Annals of Ulster have, under the year 1387, a certain *Matha mac Conlega*.

As to *Qunacan-os*, this should be in later Irish possibly *Connacán*, genitive *Connacána*, and the former occurs, written, however, *Connacan*, and borne by a certain *Connacan mac Colmain*: see Stokes's "Patrick," pp. 174, 5, and the Introduction, p. lxiiij, where the editor identifies this Connacan with a man killed in Ulster in the year 853. This is borne out by the "Chronicon Scotorum," which calls him *Connecan mac Colmain* (A.D. 855) as do also the "Four Masters" and the "Annals of Ulster" (A.D. 854). The "Four Masters" spell this man's name *Conneccan*, but under the year 910 they mention another man of the name, which this time they write *Connican*. Thus we have the variants *Connacan*, *Connecan*, *Conneccan*, *Connican*, all with *nn*, which is probably more correct than the *n* of the Ogmic form; and supposing this to prove well-founded, one would seem to be warranted in regarding *Connacán* as a diminutive of the name *Conn*. Lastly, there is a very serious difference of declension between *Qunacanos* and *Connacán*, namely, that in later Irish the diminutives in *-cán* make their genitives in *-cáin*, for an earlier *-cān-i* or *cagn-i*, and not in *-cán-a*, for an earlier *-cān-ōs*. But one may, perhaps, regard this as an instance of the encroachment of the genitive in *i* of the favourite declension, and here it may have involved the confusion of *-ān* with *ān*; but I must confess that I am not satisfied with this conjecture, which is only meant to stand till a better one has been suggested.

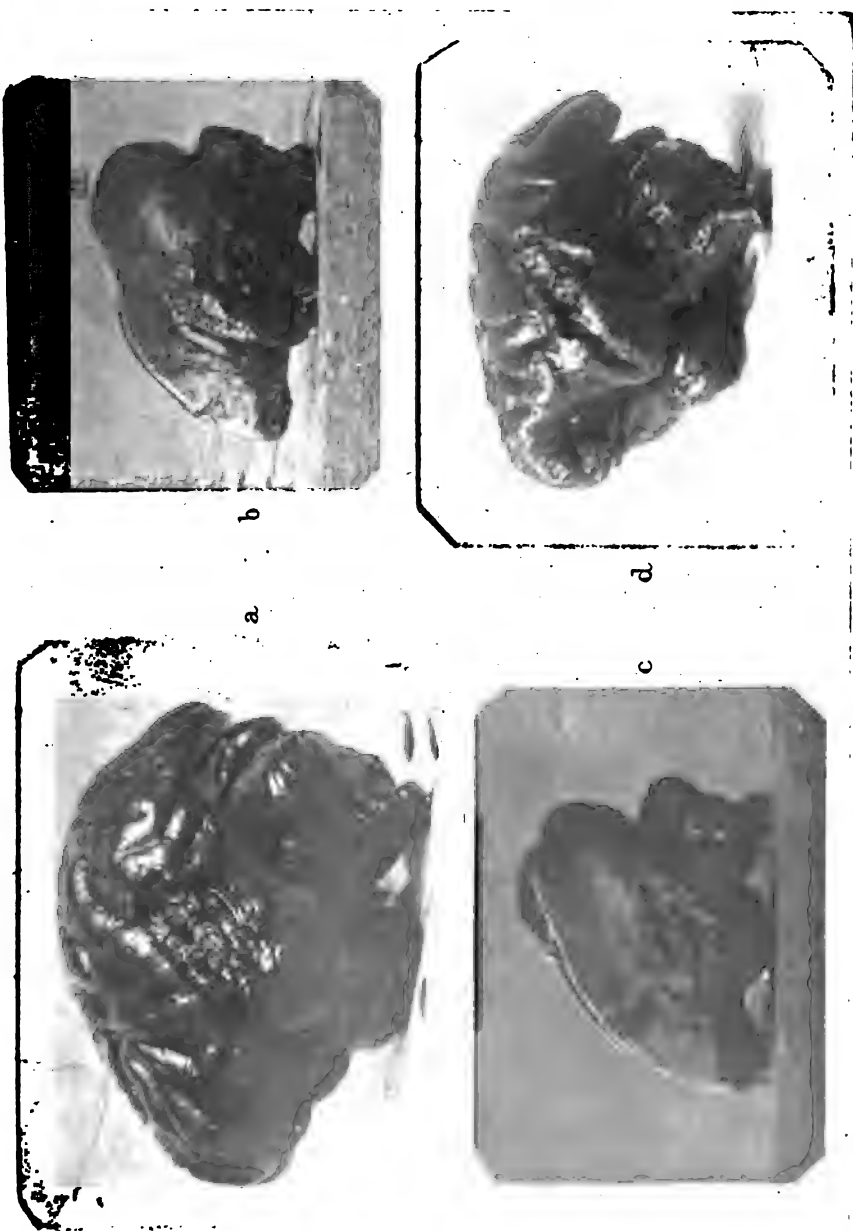


PLATE XIV.—Showing photographic representations of the lesions from four other experiments, viz.:—
(a.) from monkey ix. (b.) from marmoset xv. (c.) from marmoset x. (d.) from monkey xii.





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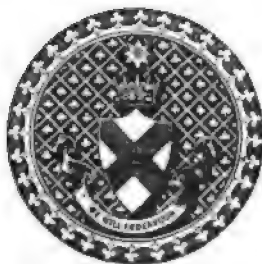
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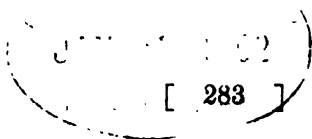
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The Academy

XVIII.

NOTES ON SOME IRISH ANTIQUITIES DEPOSITED WITH
THE ACADEMY. BY EDWARD PERCEVAL WRIGHT,
M.D., President of the Royal Society of Antiquaries, Ireland.

[Read DECEMBER 10, 1900.]

At a General Meeting of the Society of Antiquaries of Ireland, held in Dublin on the 12th of April, 1899, it was resolved—"That the Council are authorized to deposit with the Royal Irish Academy a number of Antiquities (scheduled), on condition that the Academy consent to have the same placed on view in the Museum of the Royal Irish Academy, and that they be marked or labelled as 'deposited by the Royal Society of Antiquaries, Ireland.'" These conditions were accepted by the Royal Irish Academy, and the specimens are now handed over to the care and custody of the Academy. It has been considered advisable that a short statement of the nature of the Antiquities deposited should be printed; hence the following Notes.

With the exception of the skulls described under (10), all the specimens were found outside the existing limits of the county of Kilkenny. It having been thought advisable that the Museum at Kilkenny should contain only those Antiquities found within the county, the necessity became great for the proper preservation of the remarkable Antiquities presented to the Society, which had been found outside this area.

The following notes are mostly compiled from the pages of the *Journal* of the Society, to which references are given:—

(1). *A Stone, with Cup-and-Ring Markings*.—This stone was found on the Ponsonby Estate, in the neighbourhood of Youghal, about twenty-five years ago, the markings on it present a very characteristic example of a cup-like depression, surrounded by seven concentric circles, grooved in the stone, a straight grooved channel extends from the central cavity through the whole of the circles, and projects a little beyond the outermost circle.

The stone is said to have been found with others which were unmarked; it was buried in the soil; the material seems to be a hard

whinstone; it has been carefully figured and described by the late W. F. Wakeman in the *Journal* of the Royal Society of Antiquaries, Ireland, vol. xvii., c. s. Besides the principal scribing, a number of separate cup-markings are to be found.

These cup-markings in Ireland are very often to be found on rocks *in situ*, but are also to be met with on detached boulders, the present specimen being only thirty-three inches by twenty-six inches, and averaging twelve inches in thickness makes it a very desirable specimen for a Museum.

(2). *Crannoge Timber, showing mortices*.—In 1870, our Member, Mr. Thomas Plunkett, called the late Mr. Wakeman's attention to a crannoge at Ballydoo Lough, some five miles from Enniskillen, not far from the old road to Tempo.

The story of how Mr. Wakeman explored this crannoge, and of the very interesting remains which he found in it, are to be found in the *Journal* of the Royal Society of Antiquaries, Ireland, vol. xi., c. s., with numerous illustrations from his pencil.

Among the most important of the finds was that of a timber-framed house or hut which occupied the central and most elevated portion of the crannoge. The timber was oak, and the well-squared planks were not only grooved but mortised for the insertion of upright timbers. The late Earl of Enniskillen, hearing of this crannoge, visited the site, and secured the timbers of the log-house and the other remains for presentation to the Museum at Kilkenny, where they were to have been placed forming the entrance door to a "Crannoge Room."

Mr. Wakeman tells the story of how when the timber was carted to the Railway Station at Enniskillen for booking to Kilkenny, the railway porters at first refused to accept "such rubbish, as there was not one sound piece in the whole lot, and the carriage would never be paid at Kilkenny." Lord Enniskillen's name had to be invoked, and after some more controversy the "rubbish" was sent off.

The Museum at Kilkenny was far too small to enable this timber to be properly displayed, but now it may be hoped that it has found its last resting-place.

(3). *Various fragments of Pottery from Crannoge Finds outside of the County of Kilkenny*.—From time to time, as papers on Crannoges were read before the Royal Society of Antiquaries, Ireland, collections of fragments of Pottery found in them were exhibited; in some cases these fragments were found in considerable numbers, so that a partial restoration of the vessels would be possible, the preservation and

restoration of such requires not only skilled labour, but also considerable space, and so it was thought desirable that these remains should be deposited in the Royal Irish Academy Museum where they would be both housed and cared for.

(4). *Various fragments of Sepulchral Urns.*—As in the case of the pottery found in crannoges, so in the cases, which were somewhat numerous, of pottery forming urns found in the various forms of sepulchres discovered outside the bounds of the County of Kilkenny.

(5). *A much-mended Bronze Vessel.*—I have been unable to trace the history of this interesting vessel, the shape of which will be best understood from the accompanying figure, from a drawing made by Miss Simpson. I am indebted to Mr. Coffey for the following measurements:—The height is $12\frac{1}{2}$ inches; the diameter of the mouth varies from $11\frac{1}{2}$ to $12\frac{1}{2}$ inches; the diameter of the base is $5\frac{1}{2}$ inches; greatest diameter at shoulder $12\frac{1}{2}$ inches.



Mended Bronze Vessel.

(6). *A Necklace of Stone Beads.*—Early in 1849, Mr. Shearman, of Kilkenny, exhibited at a meeting of the Royal Society of Antiquaries, Ireland, a collection of large jet beads, which appeared to have formed portion of a necklace of large size. These beads had been found about two years previously under six feet of turf-mould in Main Bog near Cullohil, in the Queen's County, and had been thrown up while digging the foundations of a bridge. The beads exhibited were ten in number, somewhat rudely formed, imperfectly polished, and of various sizes; the prevailing form was a flattened oval or egg-shape, two of them had a small projection or ridge formed round the extremities of the hole with which they were pierced. The two largest weighed three and a-half ounces each, the smallest weighed 13 pennyweights, 7 grains. The number of beads originally found was said to be eighteen or twenty, but they had been given away from time to time by their original owner; when found they were not strung together.

Some will remember the splendid collection of Irish Antiquities exhibited in the Archæological Court of the 1853 Dublin Exhibition.

Among the treasures sent up to Dublin on that occasion from Kilkenny was this necklace; and in an adjoining case, exhibited by this Academy, were a few similar beads, which Mr. Richard Hitchcock believed formed part of the original set.¹

(7). *A Stone Mould for a Celt.*—This stone mould was found by James Aylward while reclaiming a bog at Ballydagh, in the barony of Iverk. It was found about four feet below the surface. The material is a hard grit; there is an excellent drawing of it in the *Journal* of the Royal Society of Antiquities, Ireland, vol. vii., c. s., p. 307. It was a mould for what is called a pocketed, or perhaps as Ellacombe suggested, better called a "socketed" celt. It may be noted that Du Noyer gives several very ingenious hints about this mould, and especially about the upper portion with the cruciform ridges.²

(8). *Small Stone Box with Inner Wooden Box.*—Dromiskin, in the County of Louth, has an ancient history; it formed part of the territory of Cuchullain; we find early mention in the Irish Annals of ecclesiastical buildings at this place; some remains of its Monastery are said to be recognisable in the garden-wall of Dromiskin House. Its Round Tower is a National Monument; the ground between the Monastery walls and the Round Tower was probably once a burial ground. Sometime, apparently in 1862, the then tenant had removed about five feet of rich soil from the surface of the ground, and in doing so had come upon a cist about 6 feet long, 2½ feet wide, 1½ feet deep. The remains of a human skeleton were in the grave; the skull, which had lost its face bones, is now on the table, and the stone box, the present object of notice, was found by the side of the skull. This stone box was of a hard close-grained grit, the cover was of green stone rubbed into shape, and fitting closely into the rabbet made to receive it, but it does not slide into its place beneath a dovetail. The timber box was cut from a solid piece of yew wood, and was made to fit tightly into the stone box. The bottom and the lower parts of the sides were broken into small fragments. The lid was slid into a dovetail rabbet and was closed with a spring. The cover was lined on the outside by thin leather which concealed the spring fastening and its rivets. Inside the inner box was a single pin of bright yellow bronze. The pin had evidently

¹ *Journal*, Royal Society of Antiquaries, Ireland, vol. ii., c. s., p. 32, and vol. ii., c. s., p. 287.

² *Loc. cit.*, p. 380.

been broken before being placed in the box ; when perfect the box would not have contained it.

A great deal of interest has been excited by the discovery of this, as far as I know, unique specimen, and there has been some controversy as to the date of the burial, one writer fixing it "at or about the introduction of Christianity into Ireland." Dr. Thurnham, from the mechanical details of the little yew box, seems more correctly to assign it to the Mediæval period, and to regard the remains as those of a member of the ecclesiastical buildings which still exist. One would like to know the mystery of this broken pin, so treasured up in life and then buried in the grave, but this is hopeless. Bronze pin and needle cases have been found in Eastern excavations, such as those in bronze found at Salamis, but such throw no light on the box now exhibited. This object was given to the Kilkenny Museum by the Right Hon. John Wynne.¹

(9). *Portion of a Pastoral Staff*.—In March, 1854, Mr. James F. Blake, of Ballynemona, presented to the Kilkenny Museum the head of an ancient Irish pastoral staff, which had been in his family for a considerable period ; he could not say how it came into his family, or to what part of Ireland it originally belonged ; his longest recollection of it was its being used as a plaything by the children of the house. He remembered that when he first knew it it was about two feet long in the staff, and it had two more bosses of intertwined lacertine work below those still remaining. The staff itself was covered with thin plates of silver, the pilfering of which was possibly the cause of the reduction in the size of the staff. The wood appeared to be yew, over which, at this moment, some small remnants of silver coating were to be found. The peculiarly shaped head was of bronze and nearly devoid of ornament. The recurved dragon heads had their eyes filled in, two with red enamel and two with silver ; the red eyes were on one side of the heads the silver ones on the other.

This staff has been examined by Petrie, Todd, Graves, Albert Way, and Westwood, and has been described and figured by James Graves : in the judgment of all, so far as Ireland is concerned, it is unique. I am glad that it now should form one of the fine series of Pastoral Sticks which enriches our Museum, and I venture to express the hope that we may some day have an illustrated catalogue of this portion of our Ecclesiastical Antiquities. Wilde had begun the collection of the materials for such ; a great deal has been added since then ; and

¹ *Journal*, Royal Society of Antiquaries, Ireland, vol. vii., c. s., p. 201.

Mr. J. R. Garstin, our late Treasurer, by undertaking such a volume, would leave us under a lasting obligation.¹

(10). *Some Crania*.—Of the six skulls now deposited, three have no relationship with Ireland, these are from Ashantee, from China, and Greece. In a small local Museum like that of Kilkenny, it is difficult to dispose of parts of the human skeleton; and these three skulls, which were presented with the hope that they should form the basis of a general collection of skulls, have remained without addition since the date of their presentation. Of the remaining three, one is from the stone grave opened at Dromiskin, Louth, and already referred to in connexion with the finding of the yew box within the stone case. It has been described as of a low type, manifesting great animal and but little intellectual development. Perhaps Professor Haddon would include it and the next in one of his studies of Irish Ethnology. The last skulls to be alluded to are two from the precincts of St. Canice's Cathedral. In July, 1847, the internal base of the Round Tower was found filled with *débris* to almost the sill of the doorway, and on this being cleared out, some 18 inches in depth of calcined clay with charcoal, and then some 18 inches in depth of black earth were also removed. Beneath these two layers a pavement was found, which was covered by an inch thick coating of mortar. Under this several graves were discovered, most of the bones in them were crumbling to decay, but the two imperfect skulls before you were secured; they have been described in "The History and Antiquities of the Cathedral Church of St. Canice," Kilkenny, by Rev. J. Graves and J. G. A. Prim.

¹ *Journal, Royal Society of Antiquaries, Ireland*, vol. iii., pp. 55 and 137.

XIX.

REPORT ON THE HEPATICÆ OF THE DINGLE PENINSULA, BARONY OF CORKAGUINY, COUNTY KERRY. By DAVID McARDLE.

(PLATES XVI. AND XVII.)

[COMMUNICATED BY FREDERICK WILLIAM MOORE, A.L.S., ON BEHALF OF
THE FLORA AND FAUNA COMMITTEE OF THE ROYAL IRISH ACADEMY.]

[Read JANUARY 14, 1900.]

HEREWITH I lay before the Royal Irish Academy the result of many years collecting and research among the Hepaticæ which are to be found in the wild mountainous barony of Corkaguiny, which I have visited in search of these curious plants many times during the past 20 years.

I have been assisted to make these excursions by grants from the Flora and Fauna Committee of the Royal Irish Academy, and I have also availed myself of the opportunities afforded me, when collecting plants there for the Science and Art Department, Dublin.

Among the eminent bryologists who previously collected Hepaticæ in the Dingle Peninsula I may mention Dr. Thomas Taylor, of Kenmare, who gathered many rarities there about the year 1813, among them *Scapania ornithopodioides* was found near the summit of Mount Brandon, which rises to 3120 feet. The celebrated bryologist William Wilson, Esq., of Warrington, visited the peninsula with Dr. Taylor, in 1829, and among the rarities recorded by him is the rare *Scapania ornithopodioides* from where Taylor previously found it, and in the Maghanabo glen he found the rare *Dumortiera irrigua*, and he was the first to publish the plant as a native of the British Isles, in the English Flora, in 1833. In more recent years Mr. Mitten, of bryological fame, followed in the footsteps of Messrs. Taylor and Wilson, and collected many rarities, and it is owing to the kind and accurate directions from him that Canon Lett and myself were able to re-discover *Scapania ornithopodioides* on the rocky north-east side of Mount Brandon. It is also interesting to note that the rare *Dumortiera* collected by Wilson in 1829, still flourishes in the Maghanabo glen.

The Hepaticæ collected by Dr. Taylor are included in his excellent work, Part. II, of Dr. Mackay's *Flora Hibernica*, and also in the *Muscologia Britannica*, of Hooker and Taylor, published in 1827.

The late Dr. David Moore, of Glasnevin, visited the peninsula many times in search of Hepaticæ and Mosses. In 1873 he brought Professor Lindberg, of Helsingfors, to Dingle, and they made searching excursions through the most likely places for these plants. The result of their collecting was included by Dr. Moore in his Report on the Irish Hepaticæ, read before the Royal Irish Academy in 1876, and by Professor Lindberg in his work *Hepaticæ in Hiberniæ mense, Julii*, 1873, lectæ. The collections made by both these eminent botanists in the Dingle peninsula are included in the appended list.

In 1875 I made searching excursions to Mount Brandon and the Maghanabo glen, on the former I discovered *Clasmatocolea cuneifolia*, and in the glen the rare *Dumortiera hirsuta*, var. *irrigua*, and *Jubula Hutchinsæ*, var. *integrifolia*. The former is also found in the West Indies, and the latter in Java. The presence of these, and other tropical plants, will convey in some degree the moist genial atmosphere which prevails most of the year in the shaded glens of the peninsula.

The result of my first excursion was very encouraging. In 1881, Mr. F. W. Moore and I stayed a fortnight in Dingle, when we got information on many places of interest from the late Rector, the Rev. William Anderson, an acute naturalist, and we also made an excursion with Dr. Hudson, medical officer of the Brandon district. From his residence, then at Vicarstown, he took us over Mount Eagle, and other places, where we made valuable collections. He is well acquainted with the Flora of the district; he now resides in Dingle. We spent a day on the west side of Mount Brandon, which we ascended from Ballybrack, and from Dingle we collected across Connor pass, and ascended Mount Brandon from the east side near Clohane. Among the rarities collected were *Jungermania anomala*, and *Lejeunea diversiloba*.

We also visited Castlegregory, Slievenagower mountain, and on to Gloghree, and Lough Doon. From the top of Connor pass we struck out for the sea coast, crossed the bridge on the Owenascaul River, and on to Minard head, and other intervening places.

In 1894, I accompanied Dr. R. F. Scharff, Professor McWeeney, and Mr. J. N. Halbert, members of your Flora and Fauna Committee, to Dingle. Our first excursion was to Anascaul, which means the ford of the heroes, and we struck the River Owenascaul, and followed it up to the Lake.

Here I found, for the first time, *Lejeunea Holtii*, which was only once found before in Killarney. From here we collected on to Lispoll, and got into Mr. Hickson's wood, which banks a dell where *Fuchsia Riccartoni* assumes tree dimensions. Among the rarities gathered was a proliferous form of *Lejeunea serpyllifolia*, with leaf margins covered with buds and young plantlets, showing the asexual mode of reproduction in these curious plants. This is figured in the Irish Naturalist, vol. iv., 1895, with others, from a paper read by me before the Dublin Naturalists' Field Club, in March of same year. Other excursions were made to Burnham Wood, Ventry, &c.

In April, 1897, I was again in Dingle with Mr. F. W. Moore. I believe it was an Easter Sunday morning that we met John Kavan at the village of Ballybrack, near the foot of Mount Brandon; he is a trusted guide, and a stranger without him would be in some danger on Mount Brandon on account of steep precipices and fogs which fall quickly. This was a beautiful clear day, and from the summit the view was one to be remembered.

During the last four years, the Rev. Canon Lett, of Loughbrickland, county Down, and myself, pushed our investigations of Hepaticæ into the most remote and unfrequented districts in the peninsula. From the foot of the Cahirconree we followed the Derrymore river through the glen to its source, under cliffs which rise to 2700 feet. From here we pushed on to Emalough and Inch, where, amongst other rarities, we found *Cephalozia denudata*; then on to Lough-anascaul, which is a truly wonderful formation of barren rocks. The best collecting ground is across the slopes to the ravine, through which the water rushes to the lake; it lies due east. We followed it to the summit, and found many rare Hepaticæ, notably *Dumortiera*, which grows there more plentifully than in any other station we know of. The rare *Metageria hamata* and *Radula Carringtoni* (fertile) was found growing on larger hepatics on wet rocks. The latter was previously only known to grow at Killarney. From here we pushed on to the bog, known as "Puck's Island," and followed the River Owenalondrig up to Barnanaghea lough, and on to the summit, 2000 feet. From this we could see across the Coumanare lakes to Brandon bay, and on the Dingle side, Castlemain harbour, the Killarney Reeks, and Dingle bay—a panorama of scenery one seldom gets a chance of looking at, and all splendid collecting ground, as we gathered *Lejeunea Holtii*, and many other rarities. From here we pursued our investigations across Ballysitteragh to Connor pass, and at the summit struck off to the Coumanare lakes—a wonderful network of loughs of various

dimensions. From here we collected round Lough Doon, or the Pedlar's lake, and we gathered *Lejeunea calyptrifolia* from rocks by the roadside; then on to Lough Adoon, where, among others, we found the rare *Porella pinnata*, and worked on to the lakes and hills near Castlegregory, across to the village of Clohane, and up the slopes of Mount Brandon to Lough Nalachan, where some good collecting was done. We crossed the Owenmore river in the Brandon valley, and on to Lough Duff, "the Black Lough." On the shelving rocks at the mountain side of the lough we gathered *Lepidozia Pearsoni* for the first time in Ireland, this being the only known locality for it. From the valley we crossed the mountain at Glins, and worked round to Brandon head, from thence on to Mount Eagle, and collected round the lake, which is the most westerly in Europe. Here we gathered many rare *Lejeunea* and *Lepidozia tumidula*.

In June, last year, we again visited the peninsula, our principal object being to endeavour to rediscover *Scapania ornithopodioides*, which is better known by Hooker's name, *planifolia*, and also *Scapania nimbosa*, a few stems of which were found by Dr. Taylor, also near the summit of Mount Brandon, in 1813. Though labouring against the difficulties of wet and inclement weather, we were fortunate in finding the former in some quantity.

From the foregoing notes it will be obvious that we have spared no amount of time or fatigue to give as complete a list as possible of the Hepaticæ to be found in the Dingle peninsula.

In the following list I enumerate 129 species. In all Ireland about 168 species are known to be found, so that around the sheltered lakes and glens of the peninsula we find only 39 species less than the total known in Ireland so far.

To previous knowledge of the Hepaticæ of the district I have added 43 species, and 24 varieties. Two of the species, *Lepidozia Pearsoni* and *Cephalozia leucantha*, are new to the Irish Flora, as are also some of the varieties.

In cases of doubt I have consulted M. B. Slater, Esq., of Malton, Yorkshire, and W. H. Pearson, Esq., of Knutsford, Cheshire, the two highest authorities on the subject in Britain at the present day, and to whom I offer my best thanks. Also to W. N. Allen, Esq., of Cærneagh, North Circular-road, Dublin, for the beautiful drawings of *Lepidozia Pearsoni*, *Scapania nimbosa* and *S. ornithopodioides*.

Order.—**HEPATICÆ.**

Sub-order I.—**JUNGERMANIACEÆ.**

Tribe I.—**JUBULÆ.**

Genus 1.—**FRULLANIA**, Raddi.

1. *Frullania tamarisci*, L. Dum. Hook. Brit. Jung., tab. 6 (under *Jungermania*).

Habitat. In large spreading patches on the trunks of trees, on rocks and wall-tops, from sea level to the summit of the highest mountains, common in the peninsula.

Var. *atrovirens*, Carrington. Stems elongated; leaves elliptic-ovate, apiculate, apex inflexed, of an indigo-green colour.

Hab. On wet rocks, Loughanscaul, Lett and McA., Sept., 1898, rare.

Var. *robusta*, Lindberg. *Hab.* on rocks. Connor hill, Lindberg and Moore, July, 1873.

2. *Frullania microphylla*, Gottsche. Pearson in Journal of Botany, 1894.

Hab. On the bark of trees, and on rocks. Anascaul, D. McA., May, 1894; Connor hill, D. McA., June, 1894; on rocks on the west side of Mount Brandon, near the summit, F.W.M. and D. McA., April, 1897; Maghanaboglen, F. W. M. and D. McA., April, 1897; on smooth rocks on the shores of Lough Duff, Lett and McA., May, 1899.

3. *Frullania fragilifolia*. Taylor in Trans. Bot. Soc., Edin., 2, p. 43. Spruce. Muse et Hepat Pyren. in Trans. Bot. Soc. Edin., 3, p. 215.

Hab. On damp rocks, and on tree trunks, among mosses; Burnham Wood, between Dingle and Ventry, D. McA., May, 1894, rare.

4. *Frullania germana*, Taylor. *Jungermania germana*; Taylor in Trans. Bot. Soc. Edin., 2., p. 45. Pearson, Hepat. Brit. Isles, p. 31, plate 4, 1889.

Hab. On rocks, and on the trunks of trees. On rocks. Connor hill, Lindberg and Moore, 1873; on trees, Burnham Wood, D. McA., May, 1894; West side of Mount Brandon. Lett and McA., Sept., 1897; Anascaul, Lett and McA., Sept.,

1898; on rocks near the lake on Mount Eagle, Lett and McA., 1898; rocks between Emalough and Inch, Lett and McA., May, 1899; Lough Duff, Lett and McA., May, 1899.

5. *Frullania dilatata*, L. Dum. *Jungermania dilatata*, Hook. Brit. Jung., tab. 5.

Hab. On the trunks of trees and on rocks. Near Ventry, Lindberg and Moore, 1873. Connor hill, D. McA., 1875. Burnham Wood, D. McA., May, 1894. Lett and McA., Sept., 1898. Hickson's Wood near Anascaul, D. McA., 1894, Lett and McA., 1897. Anascaul on rocks, Lett and McA., 1898; Lough Duff, Lett and McA., May, 1899; Rocky bank, between Emalough and Inch, Lett and McA., 1899.

Var. *flabellata*, Spruce. Growing in shallow tufts, spreading in neat strata; of a pale olive colour. Stems bipinnate with spreading short branches, leaves imbricate, ovate, apiculate, apex often inflexed, larger and more imbricate near the apex of shoots, delicate, hyaline. Stipules three times as broad as the stem bifid to about $\frac{1}{2}$ subrotund, imbricated and oblong, near the apex of shoots, nearly as long as the leaves, giving the plant a remarkable flabellate appearance, D. McA.

Hab. On the bark of trees. Hickson's Wood near Anascaul, Lett and McA., June, 1898; very rare.

Genus 2.—*JUBULA*, Dumort.

1. *Jubula Hutchinsia*, Hook. Dum. *Jungermania Hutchinsia* Hook. Brit. Jung., tab. 1. Moore, Irish Hepaticæ, p. 608, under *Frullania*.

Hab. On wet rocks. In caves near the sea; Dingle bay, Dr. Moore, 1870; Maghanabo glen, D. McA., 1875; Loughanascaul, D. McA., 1894; Lett and McA., 1898; on the west side of Mount Brandon, Lett and McA., Sept., 1897; shore of Lough Doon, D. McA., 1894.

Var. *integrifolia*, Nees, Lindberg, Moore, Irish Hepaticæ, p. 609, with excellent figure, pl. 45. His description is as follows:—This appears to me a very distinct plant from the typical form of the species. It differs, 1. In the leaves being more obovate and less spinulose at their margins. 2. In the absence of an auricle to the margin of the leaf. 3. In the amphigastria being smaller, and the margins of their lobes more entire. 4. In the smaller size of the plant, and its olive-green

colour. The colesules are terminal on the main branches and on their middle. They are trigonal as in the typical form. The andrœcium consists of small amenta, which proceed from the middle of the stem branches. (Autœcious). I have, however, no doubt that the plant is of the same kind as that noticed in G. L. et N. Synop. Hep., p. 426, as having been found in the Island of Java by Blume. Professor Lindberg, in his Paper on Hepaticæ collected in Ireland,¹ states that this plant is found in North America and in Java.

Hab. On wet rocks, and on the frondosæ Hepaticæ. On wet rocks in caves, Connor hill, Lindberg and Moore, July, 1873; on the fronds of Dumortiera, side of a mountain stream, in the Maghanabo glen, near Clohane, fertile, D. McA., 1875; on rocks; Loughanscaul, Canon Lett, Sept., 1898.

Genus 3.—*LEJEUNEA*, Libert.

1. *Lejeunea Mackai*, Hook, Spreng. *Jungermania Mackaii*, Hook. Brit. Jung., tab. 53. *Lejeunea Mackaii*, Spreng. Syst. Veg. 4, p. 233, 1825-7.

Hab. On wet rocks. Loughanscaul, Lett and McA., Sept., 1898 (rare).

2. *Lejeunea ovata*, Taylor MSS. *Jungermania ovata*, Dicks., Pl. Crypt. Brit., 3, p. 11, tab. 8, fig. 6. Pearson, Hepat. Br t. Isles, p. 42, Plate 8.

Hab. In damp shaded places among mosses and the larger hepatics, old wood, &c. Among *Racomitrium*, Connor hill, Lindberg and Moore, 1873; on *Frullania*, F. W. M. and D. McA., July 1881; Lett and McA., 1887; on the north-east side of Mount Brandon, D. McA., 1875; Maghanabo glen, D. McA., 1875; Anascaul, Lett and McA., Sept., 1898. Barnanaghea lough, Lett and McA., Sept., 1898; Coumanare Lakes, Lett and McA., 1898. On old wood. Lough Nalachan, Lett and McA., May 1899; Lough Duff, Lett and McA., May 1899; Derrymore glen, near Cahir Conree, Lett and McA., May 1899.

3. *Lejeunea serpyllifolia*, Dicks., Libert. *Jungermania serpyllifolia*, Dicks., pl., crypt., Brit. 4, p. 19. *Lejeunea serpyllifolia*, Libert. Ann. Gen., Sc. Phys. 6, p. 374., n. 2; Pearson, Hepat., Brit. Isles, p. 45, plate 10, 1899.

¹ Acta Societatis scientiarum fennicæ x Helsingfors, 1875.

Hab. On the trunks of trees, damp shaded banks, on rocks among moss, and on stones near streams, very common, from sea level to the summit of the highest mountains.

Var. *planiuscula*, Lindberg. Elongate, about 1 m.m. wide, pale or green pellucid, when dry shining, less branched, intricate and fragile, planiuscula, leaves more or less remote, antical lobe convexulous slightly decurved, obliquely ovato-oval rotundato obtuse, margin entire, postical lobe 5-7 times smaller, stipules subadpressed, 2 to 3 times larger than the postical lobe, convexiuscula, rotundato-oval, sinus more or less broad and obtuse, segments somewhat obtuse, margin entire, perianth elliptic-clavate, below terete, upper part 5 plicate, angles complanate, margin smooth. (*Lindberg.*)

Hab. On rocks among mosses. Connor hill, Lindberg and Moore, 1873.

Var. *cavifolia*, Lindberg. Smaller and often yellowish-pale or green, very ramose, intricate and fragile, convex, leaves closely imbricate, antical lobe obliquely broadly ovate-oval, very obtuse, apex distinctly narrower, but never acute, entire, postical lobe 3-5 times smaller, cells very chlorophyllose and thickened, trigones distant, stipules subadpressed, as large or larger than the postical lobe, convex, oval rotund, perianth narrower at the base, oval pyriform upper part 5 plicate. (*Lindberg.*)

Hab. On a turf bank among rocks between Emalough and Inch, Lett and McA., May, 1899.

Var. *heterophylla*, Carrington. Plant very fragile, branches attenuated, leaves small, variously shaped, with the lobule present or obsolete, alternate, distant, chlorophyllose.

Hab. On wet rocks among mosses, frequent.

Var. *prolifera*, McArdle. Stems prostrate and copiously branched as in the type, lower leaves with adventitious buds on the margins, often well developed into fully formed plantlets, having leaves, stipules, and root hairs. Irish Naturalist, vol. iv., plate 3, figs. 3, 4, 5, 6, 7, April, 1895.

Hab. On decayed bark in Hickson's Wood, near Anascaul, D. McA., May, 1894.

4. *Lejeunea patens*, Lindberg, Acta. Soc. Fenn. Hep. Hib. x., p. 482, 1875. Moore, Irish Hepaticæ, p. 615, with excellent figure. Plate 43, Proc. R.I.A., vol. 2, 1876.

Hab. On damp rocks and on peaty banks among mosses, and on the larger *Hepaticæ*. Connor hill, Lindberg and Moore, 1873; between Dingle and Ventry, Lindberg and Moore, 1873; on the west side of Mount Brandon, F. W. M. and D. McA., 1881; Maghanabo glen, D. McA., 1875; Mount Eagle, F. W. M. and D. McA., 1881; Coumanare lakes, Lett and McA., Septr., 1898; Loughanscaul, D. McA., 1894; Lett and McA., 1898; Lough Adoon, Lett and McA., Septr., 1897; Barnanaghea lough, Lett and McA., Septr., 1898; Derrymore glen, Lett and McA., May, 1899; Lough Duff, Lett and McA., May, 1899.

Var. *erecta*, M'Ardle, Irish Nat., vol. iii., p. 139. Plants about a quarter of an inch long, growing in dense compact patches of a bright yellow colour. Stem stronger than in the type, erect, irregularly branched, often secund, bearing numerous root hairs in isolated tufts up to the apex, which show well marked haustoria. Leaves closely imbricated, densely chlorophyllous in the upper two-thirds of the plant, stipules larger than in the type, ovate or sub-rotund, cleft for more than half of their length into two obtuse (often acute) lobes. Amentæ short, consisting of four to six altered leaves. Perianths copious, lateral, sharply keeled, stalk of the capsule with three or four distinct articulations.

Hab. On damp peat among rocks, Connor hill, D. McA., June, 1894, rare.

5. *Lejeunea flava*, Swartz. Nees; *Jungermania flava*, Swartz. Prodr. Fl. Ind., p. 144.

Hab. On decayed wood and bark and among mosses, and on large *Hepaticæ*. Connor hill, F. W. M. and D. McA., July, 1881; Lough Adoon, Lett and McA., Septr., 1897; Loughanscaul, Lett and McA., Septr., 1898; Barnanaghea lough, Lett and McA., Septr., 1898; Hickson's Wood, D. McA., 1894; Mount Eagle lake, Lett and McA. Septr., 1898; Burnham Wood, Lett and McA., 1898; Mount Brandon west, F. W. M. and D. McA., April, 1897. Among rocks (on *Metzgeria*) between Emalough and Inch, Lett and McA., May 1899. Among *Hypnum*, Lough Nalachan, Lett and McA., May 1899.

Sub-species, *Lejeunea Moorei*, Lindberg, in Acta Soc. Fenn. Hep., Hib. x., p. 487, Moore, Irish *Hepaticæ*, p. 615, with excellent figure, plate 44.

Hab. In damp, shaded places, among mosses and the larger Hepaticæ. Hickson's Wood, D. McA., 1894; Connor hill, and on the west side of Mount Brandon, F. W. M. and D. McA., July, 1881; Maghanabo glen, D. McA., 1875; Lough Duff, Lett and McA., May, 1899; Derrymore glen, Lett and McA., May, 1899; rare.

6. *Lejeunea Holtii*, Spruce, Journal of Botany, vol. 25, p. 33, pl. 272, 1887.

Hab. On wet rocks in shaded places, among mosses and the larger Hepaticæ. In the crevices of rocks among *Fissidens taxifolius*, Loughanscaul, D. McA., May, 1894, Mount Eagle lake, Lett and McA., Sept., 1898; shores of Barnanaghea lough, Lett and McA., Sept., 1898; Lough Nalachan, Mount Brandon, Lett and McA., May, 1899. This rare *Lejeunea*, which had hitherto been only known to grow at Killarney, differs from every other *Lejeunea* in the female flowers, being borne on exceedingly short branchlets, which normally put forth no sub-floral innovations, such as constantly exists in all our other species. In size it resembles *L. flava*, or luxuriant *serpyllifolia*, but usually differs at sight from both by the pale, reddish tinge of the foliage. Even where the leaves are of the yellow-green of almost ripe limes, dried specimens speedily assume a rufus hue when moistened. Another important and unique character is afforded by the large pear-shaped perianths being so very strongly and sharply keeled that at first sight they seem broadly five-winged. The female flowers often alternate, or are variously mixed up with male catkins of about the length of the adjacent leaf, and consisting of from two to five pairs of cymbiform bracts. Where inflorescences of both sexes are numerous they render the stem or branch elegantly pinnulate. The only species which *L. Holtii* might be confounded with is *L. flava*, which grows near it. Although nearly equal in size is far more delicate and pellucid, and its usual slight tinge of red is never seen in the yellow or green foliage of *L. flava*. The latter, besides the essential difference of the perianths being terminal on branches of various lengths, or on the main stem, and invariably putting forth from their base a leafy innovation, or even a pair of opposite innovations, each of which may in like manner bear an apical flower, subtended by a secondary innovation, differs also in the tufted habit, the imbricated leaves (which, although only slightly

different in form, have smaller and more chlorophyllose cells), but, above all, in much smaller obtusely five carinate perianths, as compared with the large, deeply plicato-carinate perianths of *L. Holtii*. (*Spruce*.)

7. *Lejeunea ulicina*, Taylor. *Jungermania ulicina*, Tayl., in Trans. Bot. Soc., Edinb., p. 115, 1841: *Jungermania minutissima*, Hook. Brit. Jung., t. 52, *ex parte*, *neo Smithii*. Pearson, Hepat., Brit. Isles, p. 54, pl. xiv., fig. 1.

Hab. On the trunks of trees, among mosses, and on the smooth bark, rocks, etc.; Loughanscaul, among Hypnum, on the damp rocks, Lett and McA., Sept., 1898, rare.

8. *Lejeunea diversiloba*, Spruce, Journ. of Bot., 1876; *Lejeunea minutissima*, var. *major*, Carrington, Trans. Bot. Soc., Edin., vol. 8, p. 468, tab. 17, fig. 1; Pearson's Hepat., Brit. Isles, p. 56, plate 15, 1899.

Hab. On moist rocks, and on the trunks of trees, often epiphytic on the larger hepatics and mosses, on damp rocks among *Metzgeria conjugata*, Connor hill, F. W. M. and D. McA., July, 1881; Lett and McA., September, 1898; Loughanscaul, Lett and McA., September, 1898; Coumanare lakes, Lett and McA., September, 1898; Barnanaghea lough, Lett and McA., Sept., 1898; Lough Nalachan, Brandon, Lett and McA., May, 1899, rare.

9. *Lejeunea hamatifolia*, Hook., Dum. *Jungermania hamatifolia*, Hook., Brit. Jung., t. 54.

Hab. On damp rocks, decayed wood, and on the bark of trees, and among the larger mosses and hepatics. On the bare rocks, Connor hill, with *L. calyptrifolia*, Lindberg and Moore, July, 1873, very fine, with perianths, Lett and McA., Sept., 1898; Mount Eagle, F. W. M. and D. McA., July, 1881; Lett and McA., 1898; Loughanscaul, D. McA., 1894; on *Radula Carringtoni*, Lett and McA., Sept., 1898; Lough Adoon, F. W. M. and D. McA., April, 1897; Barnanaghea lough, Lett and McA., 1898; on rocks, Lough Duff, in the Brandon valley, Lett and McA., May, 1899; on the north-east side of Mount Brandon, Lett and McA., June, 1900.

10. *Lejeunea calcarea*, Libert in Bory. de St. Vine. Ann des Sc. Nat. vi., p. 373., n. 1, t. 96, f. 1; *Jungermania hamatifolia*, var. *echinata*, Hook., Brit. Jung., 1816; *Lejeunea calcarea*, Pearson, Hepat., British Isles, p. 59, plate 16.

Hab. On rocks in shady places; Mount Eagle, F. W. M. and D. McA., July, 1881; Connor hill, Lett and McA., Sept., 1897, rare.

11. *Lejeunea minutissima*, Smith, Eng. Bot., t. 1633; Hook., Brit. Jung., tab. 52 (excepting fig. 3, which is *ulicina*). *Jungermania inconspicua*, Raddi, in Act. Soc. Mod., 1818, Pearson Hep., Brit. Isles, p. 61, pl. 18.

Hab. On the trunks of trees and on decayed wood, and among the larger mosses and hepatics. Glen, on Mount Brandon, Dr. Moore; Connor Hill, Moore and Lindberg, 1873; Burnham Wood, fertile, D. McA., May, 1894; in Hickson's Wood, near Anascaul, Lett and McA., Sept., 1898.

12. *Lejeunea microscopica*, Taylor. *Jungermania microscopica*, Tayl. in Fe. Hib. II., p. 59; Tayl. in Hooker's Journal of Botany, 4; p. 97, t. 29; Pearson. Hep. Brit. Isles, p. 63, plate 19, 1899.

Hab. Epiphytic on the larger hepatics as *Frullania*, and among the branches of *Thamnium* and other mosses. Glen, on Mount Brandon, Dr. Moore; very fine on the N.E. side on *Diplophyllum*, Lett and McA., June, 1900. On *Frullania*, Connor hill, Lindberg and Moore, 1873. D. McA., Sept. 1877. Loughanscaul, Lett and McA., Sept. 1898. Extremely rare, from its minuteness may easily escape detection and doubtless occurs in other localities in the peninsula.

13. *Lejeunea calyptrifolia*, Hook. Dum. *Jugermania calyptrifolia*, Hook. Dum. Brit., Jung., t. 43.

Hab. On the trunks of trees often epiphytic on *Frullania*, and on the bare moist rock. Connor hill, near the "Doctor's Well," on barren rocks, Lindberg and Moore, 1873. F. W. M. and D. McA., July, 1881. Lett and McA., Sept., 1897-8. Loughanscaul on *Frullania*, Lett and McA., Sept., 1897. On the stems of *Abies* and *Pinus* in Hickson's Wood, fertile, D. McA., May, 1894. On *Diplophyllum* associated with *L. ovata*, Barnanaghea, Lett and McA., June, 1899.

Tribe II.—JUNGERMANIÆ.

Sub-tribe I.—RADULÆ.

Genus 4.—RADULA, Dumort.

1. *Radula voluta*, Taylor in G. I. N. Synop. Hep., p. 253. *Radula Xalapensis*, Lindberg, Hepat. Hib., 1875. Moore, Irish Hepat., p. 616; Pearson, Hep. Brit. Isles, p. 67., pl. 21.

Hab. On moist rocks and on the trunks of trees. Burnham Wood, Ventry, D. McA., 1894. On rocks, Mount Eagle lake, Lett and McA., Sept., 1897 (rare).

2. *Radula aquilegia*, Taylor. *Jungermania aquilegia*, Tayl. Trans. Bot. Soc. Edin., vol. xi., p. 115–117. Pearson, Hep. Brit. Isles., p. 74., plate 25.

Hab. On wet rocks, often epiphytic on *Frullania*. Shores of Dingle bay, Carrington, 1863. Connor hill, D. McA., 1877. On the west side of Mount Brandon, F. W. M. and D. McA., April, 1897, Mount Eagle, Lett and McA., 1898. On *Frullania Tamarisci*, Anascaul, D. McA., 1894; Lett and McA., 1898. Burnham Wood, Lett and McA., Lough Nalachan, Lett and McA., 1899; Derrymore glen, Lett and McA., May, 1899.

3. *Radula Carringtoni*, Jack in Flora, p. 385. *Radula aquilegia*, Taylor, var. major, Carrington Trans. Bot. Soc. Edin. vii., p. 455. McArdle and Lett, Hepaticæ of Torc Waterfall, Killarney, 1897, p. 321, Plate viii., 1899, Proc. R.I.A., vol. v. n. 2, 1899.

Hab. On wet rocks and on the larger hepatics, Loughan-caul, D. McA. May, 1894. Lett and McA., May, 1898 (fertile). Mount Eagle lake, Lett and McA., May, 1898. Lough Nalachan, Brandon, Lett and McA., May, 1899, near the summit on N.E. side, Lett and McA., 1900. Lough Duff in the Brandon valley (rare), Lett and McA., May, 1899.

4. *Radula complanata*, L. Dum. *Jungermania complanata*, Hook. Brit. Jung., t. 81.

Hab. On the trunks of trees, rarer on rocks (common).

Sub-tribe II.—PORELLÆ.

Genus 5.—PORELLA, Dill.

1. *Porella platyphylla*, L. Lindberg. Muse. Scand., p. 3. *Jungermania platyphylla*, Hook. Brit. Jung., t. 40.

Hab. On rocks and on the trunks of trees. Mount Brandon, west, F. W. M. and D. McA., 1881. On the N.E. side on rock, Lett and McA., June, 1900. Lough Nalachan, Lett and McA., 1899. Lough Adoon, D. McA., 1894. Lett and McA., Sept., 1897. Mount Eagle lake, Lett and McA., 1898. Anascaul, D. McA., May, 1894.

2. *Porella thuja*, Dicks, Moore. *Jungermania thuja*, Dicks Pl. Crypt. Brit. Fasc. 4., p. 19.

Hab. On rocks, and on the trunks of trees. Mount Brandon, Dr. Moore, 1864, Lett and McA., 1899. Anascaul, D. McA., May, 1894. Mount Eagle lake, Lett and McA., 1898.

3. *Porella pinnata*, Dill. Lindberg. *Jungermania porella*, Dicks. Trans Linn Soc. III., p. 239. *Porella pinnata*, Lindb. Hepat. Hib. Acta Soc., fenn x. 2, 493. Pearson, Hepat. Brit. Isles, p. 89, Plate 32.

Hab. On wet rocks and on stones. In caves, Connor hill, Lindberg and Moore, 1873. On wet rocks, Anascaul, D. McA., May, 1894. Lough Adoon on Cinclidotus, Lett and McA., Sept., 1897. Lough Nalachan, Brandon, Lett and McA., 1899 (rare).

Genus 6.—PLEUROZIA.

1. *Pleurozia cochleariformis*, Weiss, Dum. *Jungermania cochleariformis*, Weiss, Pl. Crypt. p. 123. Hook. Brit. Jung., t. 68.

Hab. On wet bogs, damp banks, and swampy places. A beautiful and remarkable plant, common in the peninsula.

Sub-tribe III.—PTILIDIAE.

Genus 7.—ANTHELIA, Dumort.

1. *Anthelia julacea*, L. Dum. *Jungermania julacea*, Linn. Sps. pl., p. 1601; Hook. Brit. Jung., tab. 2.

Hab. On wet peaty banks, and on rocks. Common in the mountainous parts of the peninsula.

Var. *minor*, Moore, Irish Hepat., p. 636; Mount Brandon, Dr. Moore, 1876; Connor hill, Dr. Moore, 1876. On the west side of Mount Brandon, F. W. M. and D. McA., April, 1897.

Genus 8.—HERBERTA, Bennett, Gray.

1. *Herberta adunca*, Dicks, B. Gr. *Jungermania adunca*, Dicks, Fasc. pl. Crypt. Brit. 3, p. 12, t. 8, fig. 8.

Hab. Growing in dense tufts on the shelving crags and banks at high elevations. A very fine hepatic, distinct from all others, common at high elevations in the peninsula.

Genus 9.—*MASTIGOPHORA*, Nees.

1. *Mastigophora Woodsii*, Hook. Nees. *Jungermania Woodsii*, Hook. Brit. Jung., t. 66; *Blepharozia Woodsii*, Dumort. Recuil. 1, p. 16, Moore, Irish Hepat., p. 635.

Hab. On damp banks, and on shelving rocks, in mountainous places; Mount Brandon, Dr. Taylor and W. Wilson, 2nd Oct., 1829; Dr. Moore, 1860. In a gorge on the N.-E. side near the summit on shelving rocks and banks, Lett and McA., 6th June, 1900; Connor hill, Dr. Moore, 1860. An extremely rare and beautiful species.

Genus 10.—*BLEPHAROZIA*, Dumort.

1. *Blepharozia ciliaris*, L. Dum. *Jungermania ciliaris*, Hook. Brit. Jung., t. 65.

Hab. On heaths and among rocks in dense tufts in subalpine places; Mount Brandon, Dr. Taylor, extremely rare, the only known locality in the peninsula, has not been rediscovered by anyone since Dr. Taylor found it in 1829?

Genus 11.—*BLEPHARESTOMA*, Dumort.

1. *Blepharestoma trichophyllum*, L. Dum. *Jungermania trichophylla*, Hook. Brit. Jung., t. 7.

Hab. On turfey heaths, and in bogs among sphagnum; Mount Brandon, fertile, F. W. M. and D. McA., 1881; Mount Eagle, F. W. M. and D. McA., 1881; Lough Adeon, Lett and McA., Sept. 1897; rare.

Sub-tribe IV.—*TRIGONANTHEÆ*.

Genus 12.—*LEPIDOZIA*, Dum.

1. *Lepidonia cupressina*, Swartz. *Jungermania reptans*, var. *pinnata*, Hook. Brit. Jung., t. 75. *Lepidoxia tumidula*, Taylor in G. L. N. Syn. Hepat. p. 206; Moore, Irish Hepat. p. 621.

Hab. Forming dense cushions on the ledges of rocks, and on damp shaded banks. Mount Eagle, Lett and McA., Sept. 1898; Coumanare lakes, Lett and McA., 1898; Loughanscaul, Lett and McA., 1898; rare.

2. *Lepidozia reptans*, L. Dum. *Jungermania reptans*, Linn. Sp. pl. 1599; Hook. Brit. Jung., t. 75.

Hab. On banks in woods, and among rocks in shaded places and on decayed wood. Lough Adoon, Lett and McA., Sept., 1897; on the N.-E. side of Mount Brandon, Lett and McA., Sept., 1897; Mount Eagle, Lett and McA., 1898; Barnanaghea lough, Lett and McA., 1898; Loughanscaul, Lett and McA., 1897; bog between Emalough and Inch, Lett and McA., May, 1899; Derrymore glen, Lett and McA., May, 1899.

3. *Lepidozia Pearsoni*, Spruce. Plate I. *Lepidozia Pearsoni*, Spruce, Jour. of Bot., p. 34, 1881; Pearson, Hepat. Brit. Isles, p. 121, Plate 45.

Hab. On damp banks among rocks with Sphagnum and Hypnum. Lough Duff, in the Brandon valley, Lett and McArdle, May 1899. New to the Irish Flora. *NOTE.*—*Lepidozia Pearsoni* is well distinguished from *L. reptans* by the following characters:—"In *L. Pearsoni* the whole plant is very slender and elongate, and of a tawny colour. Stems distantly pinnate, without any rooting flagella from the underside. Leaves small, those of the stems usually distant, or at most contiguous, cloven to beyond the middle into 4, sometimes (though rarely) into 5 or 6, subulate subacuminate segments. Stipulus cloven to the middle into 4, or not unfrequently into 5, more rarely into 6, subulate obtuse segments. Inflorescence dioicous. Male spike terminal (rarely basal) on the lateral branches; very rarely indeed on a short postical ramulus."

L. reptans is of a more robust habit, with shorter, more closely branched stems; of a deep green colour when fresh, often turning bluish-white, or glaucous, in drying. Leaves subimbricated, cloven only half-way into never more than 4 segments, which are 4-7 cells wide at the base; cells broad and long. Stipules with acute segments, which are never more than 4 in number, even on the main stem, and are sometimes reduced to 3. The chief distinction, however, is in the monoicous inflorescence, with the male flowers uniformly in short catkins springing from the underside of the stem, which is their normal position in nearly every other *Eulepidozia* known to us except *L. Pearsoni*. Dr. R. Spruce.

4. *Lepidosia setacea*, Web. *Jungermania setacea*, Web. Spic., Fl. Gott., p. 143. Hook. Brit. Jung., t. 8.

Hab. Turfy bogs, shaded banks, on decayed wood; and among the larger hepatics; common.

Var. *sertularioides*, Huben. *Jungermania sertularioides*, Mich. Fl., bor. Am. 2, p. 278. Stems elongated, remotely and simply pinnate, pallid, leaves distant. Lough Adoon, Lett and McA., Septr., 1897; rare, not previously reported from Ireland.

Genus 13.—*BAZZANIA*, Bennett, Gray.

1. *Bazzania trilobata*, L. Gr. *Jungermania trilobata*, Linn. Sp., Pl. 1599. Hook. Brit. Jung., t. 76. *Mastigobryum trilobatum*, Nees, in Syn. Hep., p. 230.

Hab. In damp rocky places, shaded banks, and on decaying wood, forming dense patches; common.

2. *Bazzania triangularis*, Schl., Lindb. *Jungermania triangularis*, Schl., Pl. Crypt., Helv. 2, No. 61. *Mastigobryum deflexum*, Nees. Syn. Hep., p. 231.

Hab. On damp shaded banks, among rocks, and among the larger Hepaticæ. Mount Brandon, D. McA., 1895; Lett and McA., May, 1899, June, 1900; Connor hill, among *Scapania resupinata*, Lindberg and Moore, 1893, D. McA., 1874; Coumanare lakes, Lett and McA., 1898; Barnanaghea lough, Lett and McA., Septr., 1898; Mount Eagle lake, Lett and McA., 1898; Lough Duff, Lett and McA., May, 1899; Derrymore glen, Lett and McA., 1899.

Var. *innovans*, Nees. in G.L.N. Syn. Hep., p. 232. Carrington and Pearson Exic., No. 124.

Hab. Growing in compact patches on damp peaty soil among rocks. A remarkable form on account of the numerous slender innovations, the lower branches often flagellately attenuated, leaves entire or deeply tridentate, with oblique unequal teeth, stipules convex, entire or deeply bifid.

Hab. On damp peaty banks among rocks. Mount Eagle lake, Lett and McA., Septr., 1898. Connor hill, Lett and McA., Septr., 1897.

Var. *deveauxum*, Nees, in G.L.N., Syn. Hep., p. 232. Stems prostrate elongated, ascending at the apex, leaves alternate

distant, deflexed, ovate oblong, falcate, apex acute or tridentate, stipules large subrotund.

Hab. On damp peaty soil among rocks. Mount Brandon, Dr. Moore. Connor hill, Dr. R. W. Scully, 1870.

3. *Bauzanian triceronata*, Walhenberg. *Jungermania triceronata* Wahlenb. Fl. Carp., p. 364, n. 1207, 1814. Pearson, Hep. Brit. Isles, p. 132, pl. 49. Densely caespitose flagelliferous, brownish green, or dark brown in colour, stems slightly branched, branches erect. Leaves subimbricate, alternate, strongly deflexed, ovate, oblong, falcate, arcuate at the antical margin, bi-tridentate at the apex. Stipules twice as broad as the stem, roundish-quadrate or orbicular margin irregularly crenate or dentate, sometimes emarginate. Inflorescence cladocarpous, arising from the axil of stipule. Perianth lanceolate, cylindrical plicate at the apex, mouth small, denticulate.

Hab. On damp banks among rocks. Barnanaghea lough, Lett and McA., 1898. Lough Duff, Lett and McA., May, 1899; Lough Nalachan, Lett and McA., 1899; Mount Brandon on Pleurozia, F.W.M. and D. McA., April 1897; Coumanare lakes, Lett and McA., June, 1898.

Genus 14.—*KANTIA*, Bennett, Gray.

1. *Kantia Trichomanis*, Dicks, B.Gr. *Jungermania Trichomanis*, Dicks, pl. Crypt. fasc. 3., t. 8., fig 5. Hook. Brit. Jung., t. 79. Pearson, Hep., Brit. Isles, p. 135, pl. 51.

Hab. On shady damp banks among rocks, and in woods; common.

2. *Kantia arguta*, Nees, Lindberg. *Calypogeia arguta*, Mont. et Nees in Nees Nat. Eur., Leb. 3, p. 24. Pearson, Hep. Brit. Isles, p. 139, pl. 53.

Hab. On damp clay banks among rocks, and on the larger Hepaticæ. Near Ventry, Lindberg and Moore, 1873. Among Campylopus, Connor hill, Lindberg and Moore, 1873, F.W.M. and D. McA., 1881, Lett and McA., Sept., 1898; damp bank. Mount Eagle, Lett and McA., 1898. On the W. side of Mount Brandon, Lett and McA., Sept., 1897. Maghanabeglen, F.W.M. and D. McA., 1887. On *Hookeria lucens*, Coumanare lakes, Lett and McA., 1898. Very fine on a bank

in Mr. Hickson's wood near Anascaul, D. McA., May, 1894; on a clay bank between Emalough and Inch, Lett and McA., May, 1899; Lough Duff, in the Brandon valley, Lett and McA., May, 1899.

Genus 15.—*CEPHALOSIA*, Dum.

Sub-genus 1.—*EUCEPHALOSIA*, Spruce.

1. *Cephalosia catenulata*, Hubener. *Jungermania catenulata*, Huben., Hepat. Germ., p. 169; *J. reclusa*, Taylor in Trans. Bot. Soc., Edin. II., p. 44; Moore, Irish Hep., p. 627; Pearson, Hep., Brit. Isles, p. 144, pl. 54.

Hab. On damp shaded banks, and on decayed wood; Mount Brandon, Dr. Moore; Barnanaghea lough, Lett and McA., September, 1898; Mount Eagle, Lett and McA., 1898; Lough Adoon, Lett and McA., 1897; Derrymore glen, Lett and McA., May, 1899.

2. *Cephalosia pallida*, Spruce. *Cephalosia catenulata*. Var. *pallida*.

Spruce on *Cephalosia*, 1882; *Cephalosia pallida*, Pearson, Hepat., Brit. Isles, p. 146, pl. 55. Densely caespitose, of a yellowish-green colour; stems fastigately branched; leaves small, erect, orbicular, to oval, rotund, sub-decurrent bifid, from a third to the middle sinus obtuse segments, acute or obtuse, connivent; cells small, walls thick, stipules none; bracts larger than the leaves bifid to a third; perianth linear, fuciform mouth, finely ciliated cilia; two cells long, capsule oval, dark brown, spores pale yellow; elaters bispiral; androecia on short postical branches; antheridia oval. Differs from *C. catenulata* by its paler colour (and not a tawny brown); leaves not so deeply bifid; cells slightly larger, and bracts entire.

Hab. On turfey banks among rocks. Mount Brandon, D. McA., 1875; Mount Eagle lake, Lett and McA., 11th June, 1898; Lough Adoon, Lett and McA., September, 1897; Derrymore glen, Lett and McA., 1889.

3. *Cephalosia lunulifolia*, Dumort, Recuil, p. 18, 1835. *Cephalosia multiflora*, Spruce on *Cephalosia*, p. 38; Pearson, Hep., Brit. Isles, pl. 56.

Hab. On damp banks, decayed wood, and in bogs among Sphagnum. On the North-east side of Mount Brandon, Lett and McA., June, 1900; Loughanscaul, Lett and McA., September, 1898; Coumanare lakes, Lett and McA., Sept., 1898; rare.

4. *Cephaloxia bicuspidata*, Linn., Dum. Linn., Sp. Pl., 1590; Hook., Brit. Jung., t. 11.

Hab. On damp banks, bogs, and on decayed wood; very common from sea level to the tops of the highest mountains.

Var. *tenuirama*, Carr and Pearson, Exs. No. 252.

Hab. On a peaty bank between Emalough and Inch, Lett and McA., 18th April, 1899.

5. *Cephaloxia Lammersiana*, Huben., Hep. Germ., p. 165. *Jungermania bicuspidata*. Var. *uliginosa*, Nees. Eur. Liberm 2, 253.

Hab. In damp, boggy places. Bog on Connor hill, Dr. Moore; Lett and McA., September, 1898; near Brandon head, Lett and McA., September, 1897; Anascaul, Lett and McA., 1898; Barnanaghea lough, Lett and McA., Sept., 1898; Mount Eagle lake, Lett and McA., 1898; Coumanare lakes, Lett and McA., 1898.

6. *Cephaloxia connivens*, Dicks. *Jungermania connivens*, Dicks. pl. Crypt. fasc. 4, p. 19, t. 2, fig. 15; Hook., Brit. Jung., t. 15. Smith, E. B., t. 2496.

Hab. On wet peaty banks, bogs, and on decayed wood. Mount Eagle, F. W. M. and D. McA., July, 1881; Derrymore glen, Lett and McA., May, 1899; rare or overlooked.

7. *Cephaloxia curvifolia*, Dicks. *Jungermania curvifolia*, Dicks. pl. Crypt. 2, p. 15, t. 3, f. 7; McArdle on Hep., Hill of Howth, p. 115, pl. 4, figs. 7 to 13; Proc. R.I.A., vol. 3, ser. 3, 1893.

Hab. On decayed wood, and on damp banks, among heather, sheep-paths, &c.; Connor hill, Dr. Moore, Lett and McA., September, 1897; on the west side of Mount Brandon, Lett and McA., September, 1897; Lough Nalachan, Lett and McA., 1899; Mount Eagle lake, Lett and McA., September, 1898; rare; the most beautiful of the Irish Cephaloxia.

Sub-genus.—ODONTOSCHISMA, Spruce.

8. *Cephaloxia sphagni*, Dicks. *Jungermania sphagni*, Dicks, fasc. pl. crypt., Brit. 1, p. 6; Hook., Brit., Jung., t. 33.

Hab. In bogs, among Sphagnum, on damp peat, &c.; common in the Brandon valley and other places in the peninsula.

9. *Cephalozia denudata*, Nees., Spruce. *Jungermania sphagni*, Hook., Brit. Jung., suppl., t. 2.

Hab. On damp peaty soil in boggy places. Bog between Emalough and Inch, Lett and McA., May, 1899; extremely rare. This is the first record of the plant being found in the county Kerry.

Sub-genus.—CEPHALOZIELLA, Spruce.

10. *Cephalozia divaricata*, Smith. *Jungermania divaricata*, E. Bot., t. 719.

Hab. On heathy banks, decayed wood, and on the larger Hepaticæ; Mount Brandon, Dr. Moore, Lett and McA., September, 1897; Hickson's wood, near Anascaul, Lett and McA., 1898; Connor hill, Lett and McA., 1897; Derrymore glen, Lett and McA., May, 1899; bank between Emalough and Inch, Lett and McA., 1899.

Var. *Starkii*, Spruce on Cephalozia, p. 64. *Jungermania Starkii*, Funck. Stems attenuated, seldom branched, clothed with root-hairs; segments of leaves more ovate, or ovate lanceolate, acute or obtuse, stipules present; Mount Eagle, Lett and McA., 1898; Coumanare lakes, Lett and McA., June, 1898; Lough Nalachan, Lett and McA., 1899.

11. *Cephalozia elachista*, Jack. *Jungermania elachista* Jack, in Gottsche et Rabenhorsts Hep. Eur. Exic. with figure and description by Dr. Gottsche, Pearson, Hep. Brit. Isles, p. 184, pl. 62.

Hab. On moist, bare, peaty banks, and among the larger Hepaticæ. Mount Brandon, Dr. Moore, 1864. Connor hill, D. McA., Sept., 1875. Coumanare lakes, Lett and McA., Sept., 1898; very rare; these are the only places where it has been found in the peninsula.

12. *Cephalozia leucantha*, Spruce. Spruce on Cephalozia, p. 68; Pearson, Hep. Brit. Isles, p. 186, Plate 72.

Hab. On decayed wood and on peat among rocks. Mount Eagle lake, Lett and McA., 17th June, 1898. Extremely rare or overlooked. Not previously published as Irish.

Genus 16.—*ADELANTHUS*, Mitten.

1. *Adelanthus decipiens*, Hook, Mitt. *Jungermania decipiens*, Hook. Brit. Jung., t. 50. Moore, Irish Hepaticæ, p. 658.

Hab. On damp rocks and on peaty banks, and among the larger Hepaticæ. Connor hill, F. W. M. and D. McA., 1881; at the foot of Mount Brandon, N.E. side, D. McA., 1875. F. W. M. and D. McA., 1881; Derrymore glen, Lett and McA., May, 1899; Lough Duff, Lett and McA., 1899. Very fine on rocks between Emalough and Inch, Lett and McA., 1899.

Genus 17.—*HYGROBIELLA*, Spruce.

1. *Hygrobiella laxifolia*, Hook. *Jungermania laxifolia*, Hook. Brit. Jung., t. 56. Moore, Irish Hep., p. 653. Spruce on Cephalozia, &c., p. 74.

Hab. In the crevices of moist rocks in mountainous places. Maghanabo glen, Dr. Moore. Mount Brandon, Dr. Moore. Connor hill, D. McA., 1875. An extremely rare species, not seen recently.

Sub-tribe.—*SCAPANOIDÆ*.Genus 18.—*SCAPANIA*, Dumort.

1. *Scapania compacta*, Dumort. *Jungermania compacta*, Roth. Germ. 3, p. 375. *J. resupinata* Hook. Brit. Jung., excellent figure, t. 23. Moore, Irish Hep., p. 637.

Hab. On banks among heaths. Mount Brandon, Dr. Moore. Connor hill, F. W. M. and D. McA., April, 1897; very rare.

2. *Scapania resupinata*, L. Dumort. *Jungermania resupinata*, Linn Sp. Pl. 1599. Eng. Bot., t. 2437. Moore, Irish Hepat., p. 640.

Hab. On banks, rocks, heathy places, and on the trunks of trees. Very common in the peninsula, from sea level to the summit of Mount Brandon. At Anascaul it assumes large dimensions. A very minute form is found on the trunks of trees near the ground, and among moist rocks, which must not be confounded with *Scapania curta*, which it closely resembles; forms are found ranging from a quarter of an inch upwards.

3. *Scapania nemorosa*, L. Dumort. *Jungermania nemorosa*, Linn Sp. Pl. ed. 3, p. 1598. Hook. Brit. Jung., t. 21.

Hab. On damp shaded banks among rocks, on the trunks of trees, &c. Mount Eagle, F. W. M. and D. McA., 1881; Loughanscaul, D. McA., 1894; Mount Brandon, F. W. M. and D. McA., April, 1897; Coumanare lakes, Lett and McA., Sept., 1898; Connor hill, Lett and McA., 1897; Lough Nalachan, Lett and McA., May, 1899. Bank between Emalough and Inch, Lett and D. McA., 1899.

Var. *purpurea*, *Jungermania purpurea*, Eng. Bot., tab. 1023, excluding the magnified figure on the left. *Scapania nemorosa*, var. *purpurascens* Hook. Brit. Jung., tab. 21. fig. 16. Whole plant of a deep purple colour, leaves as in the type *ciliato dentate*.

Hab. Among rocks in wet, boggy places. Mount Brandon, D. McA., 1875, Lett and McA., 6th June, 1900. Connor hill, D. McA., 1894, Lett and McA., Sept., 1898. Maghanabo glen, F. W. M. and D. McA., April, 1897; Loughanscaul, Lett and McA., 1898; Lough Duff, Lett and McA., 1899.

4. *Scapania nimbosea*. Plate II., figs. 1, 2, 3, Taylor in Trans. Bot. Soc. Edin. 2, p. 115. Carrington, Brit. Hepat. pt. 2, Plate 7, fig. 21.

Hab. Growing up through tufts of mosses on the summit of Mount Brandon, Dr. Taylor, 1813. On the same mountain more recently, Mr. Mitten. Very rare; these are the only persons who have collected the plant on Mount Brandon that I know of. Dr. Taylor in his description of the plant writes:—"This was taken for *Jung. nemorosa*, when first brought down from Brandon hill. It differs, however by the taller size, the more deflexed lower lobes of the leaves, the slight joining between their lobes, and by the more considerable and more distant cilia of their margins. From *Jung. planifolia* which accompanied it, the present is known by the more squarrose leaves, the stronger ciliation of their margins, the more considerable connection between the lobes, and the more concave and less imbricated leaves. The calyx has not been seen, nor indeed has the plant been found again by the numerous acute observers that have ascended its native mountain."

5. *Scapania ornithopodioides* (Plate II., figs. 4, 5, 6, 7, 8, 9), Withering. *Scapania planifolia*, Dumort, Rev., Jung., p. 14. *Jungermania planifolia*, Hook., Brit. Jung., with excellent figure, tab. 67.

Hab. On damp rocky banks, and on shelving rocks, among musci and the larger Hepaticæ. Mount Brandon, Dr. Taylor, and William Wilson, 1813; in the same station, Mr. Mitten (date?). In a rocky gorge on the north-east side, on the shelving rocks, among *Mastigophora Woodsii*, &c., Lett and McA., 6th June, 1900.

6. *Scapania æquiloba*, Schwaegr., Dum. *Jungermania æquiloba*, Schw. Prodr., Hepat., p. 214; Carrington, Brit. Hepaticæ, p. 81, No. 3., pl. 8, fig. 26 partly; Moore, Irish Hepaticæ, p. 639.

Hab. Damp bank among rocks, and on damp rocks. Maghanabo glen, F. W. M. and D. McA., April, 1897; Anascaul, Lett and McA., 1898; Lough Duff, in the Brandon valley, Lett and McA., May, 1899; rare.

Var. *inermis*, Gottsche, Gott and Rab., Exic. 80-404-408. Lobes obovate, oblong, sometimes cultriform entire.

Hab. On banks in rocky places, Mount Eagle lake, Lett and McA., Sept., 1897; Loughanscaul, Lett and McA., Sept., 1898.

7. *Scapania umbrosa*, Schrader. *Jungermania umbrosa*, Schrad., Samm. 2, p. 5; Hook., Brit., Jung. t. 24, suppl. 3.

Hab. Moist rocks and banks, and on decayed wood. Mount Brandon, Dr. Moore, 1873; Connor hill, D. McA., May, 1894; Mount Eagle lake, Lett and McA., September, 1898; Coumanare lakes, Lett and McA., 1898; Derrymore glen, Lett and McA., 1899.

8. *Scapania subalpina*, Nees., Dumort. *Jungermania subalpina*, Nees, Lindenb., Sp. Hep., p. 55.

Hab. On rocks in mountain streams; bank near Inch, Lett and McA., May, 1899; Lough Duff, in the Brandon valley, Lett and McA., 1899.

9. *Scapania undulata*, Linn., Dumort. *Jungermania undulata*, Linn., Sps. Pl., p. 1598; Hook., Brit. Jung., t. 22.

Hab. On wet rocks and banks, and on stones in the mountain streams; common in mountainous parts of the peninsula.

Var. *purpurascens*, Huben., Hep. Germ.; Moore, Irish, Hep., p. 638; G. L. N., Syn. Hep., p. 66. Leaves closely imbricated, lobes rounded and shortly denticulate, texture pellucid, areolæ large.

Hab. On wet rocks and among mosses; Mount Eagle, F. W. M. and D. McA., 1881; Connor hill, D. McA., 1894-98;

Maghanabo glen, D. McA., April, 1897; near Brandon head, Lett and McA., June, 1898; on wet rocks, Barnanaghea lake, Lett and McA., June, 1898.

Var. *isoloba*, Nees, Syn. Hep., p. 66, N. ab E., Hep. Eur. 3, p. 521; *Scapania isoloba*, Dumort, Hep. Eur., p. 33. Stems often six inches long, branched, leaves large, lobes sub-equal rounded, of a deep green colour.

Hab. Floating in mountain streams; stream on the Clogreen side of Mount Brandon, Dr. Moore, Lett, and McA., September, 1897; Lough Doon, D. McA., 1894; Coumanare lakes, Lett and McA., 1898.

10. *Scapania uliginosa*, Swartz, Dumort. *Jungermania uliginosa*, Swz., Lindenb., Syn. Hep., p. 59.

Hab. Marshy places among rocks; Connor hill, Dr. Moore, 1873; D. McA., 1894; Mount Brandon, Lett and McA., Sept., 1898-1900; Loughanscaul, D. McA., 1894; rare.

11. *Scapania curta*, Mart., Dumort. *Jungermania curta*, Mart., Fl. Crypt., Erlang, p. 148, t. 4, fig. 24; Moore, Irish, Hep., p. 641.

Hab. On moist banks among rocks, and on the larger Hepaticæ and Musci; on the east side of Mount Brandon, Lett and McA., September, 1897; Lough Adoon, Lett and McA., 1897; Barnanaghea lough, Lett and McA., 1898; Connor hill, Lett and McA., 1898; Lough Duff, Lett, and McA., 1899.

Genus 19.—DIPLOPHYLLUM, Dumort.

1. *Diplophyllum albicans*, Linn., Dumort. *Jungermania albicans*, Linn. Sp. Pl., p. 1589, Hook. Brit. Jung., t. 23.

Hab. Moist banks in woods, and by the roadside, old walls, and rocks, and on the trunks of trees; common from sea level to the tops of the highest mountains, the commonest hepatic in the peninsula, varying in size from a quarter to two inches in length, often found in dense tufts five or six inches broad. A curious prostrate form grows on the banks of a stream north-east side of Mount Eagle, D. McA., 1894. On banks between Emalough and Inch very fine specimens of the male plant were collected, bearing copious antheridia.

2. *Diplophyllum Dixoni*, Hook. Dum. *Jungermania Dicksoni*, Hook. Brit. Jung., t. 48.

Hab. On rocks and on moist banks, and among the larger Hepaticæ and Mosses; rare. On the north side of Connor hill, Dr. Moore, 1873; Lough Nalachan, Mount Brandon, Lett and McA., May, 1899.

3. *Diplophyllum minutum*, Dicks, Dum. *Jungermania minuta*, Dicks, pl., Crypt. 2, p. 13, Hook. Brit. Jung., t. 44.

Hab. On peaty banks, and among mosses. Connor hill, Lett and McA., Sept., 1898; Coumanare lakes, Lett and McA., 1898; Barnanaghea lough, Lett and McA., 1898; Lough Duff, in the Brandon valley, Lett and McA., May, 1899.

Sub-tribe.—EPIGONANTHÆ.

Genus 20.—LOPHOCOLEA, Dumort.

1. *Lophocolea bidentata*, Linn., Dumort. *Jungermania bidentata*, Sm. Eng. Bot., t. 606.

Hab. On moist shady banks, among rocks in woods, and among the larger Hepaticæ. Common from sea level to the tops of the highest mountains.

2. *Lophocolea spicata*, Taylor in G. L. et N. Synop. Hep., p. 167. Moore, Irish Hepaticæ, p. 629.

Hab. In damp rocky places, on old wood, and among the larger Mosses and Hepaticæ. Connor hill, F. W. M. and D. McA., July, 1881; near Brandon head, Lett and McA., Sept., 1898; Loughanscaul, Lett and McA., 1898; Mt. Eagle lake, Lett and McA., 1898.

Genus 21.—CHILOSCYPHUS, Dumort.

1. *Chiloscyphus polyanthos*, Linn., Corda. *Jungermania polyanthos*, Linn., Sp., pl. 1597. Hook., Brit. Jung., t. 62.

Hab. Damp places, among stones, in woods, often on rocks in the mountain streams; common.

Var. *rivularis*, Nees. Stems dichotomously branched, succulent, stipules often obsolete. Stream on the W. side of Mt. Brandon, about half way to the summit, F. W. M. and D. McA., April, 1897; stream from a cavern on Connor hill, Lindberg and Moore, 1893; Mt. Eagle lake, Lett and McA., 1898; Coumanare lakes, Lett and McA., Sept., 1898.

Var. *palescens*, Lindenberg, Syn. Hep., p. 30. *Chiloscyphus pallescens*, Dumort. Hep. Eur., p. 101; Moore, Irish Hep., p. 631.

Hab. Among rocks, on banks of streams which are often submerged. Connor hill, D. McA., May, 1894.

Genus 22.—MYLIA, Gray.

1. *Mylia Taylori*, Hook., B. Gr. *Jungermania Taylori*, Hook., Brit. Jung., t. 57.

Hab. On damp banks and boggy places, common. A very fine species which grows in large patches of a purplish colour.

2. *Mylia anomala*, Hook., B. Gr. *Jungermania anomala*, Hook., Brit. Jung., t. 34. Moore, Irish Hepaticæ, p. 646.

Hab. On damp heaths, on mountains, and among Sphagnum. Connor hill, Lindberg and Moore. 1873; on the ascent to Mt. Brandon from Clohane, on damp peat, F. W. M. and D. McA., July, 1881; very rare; not found recently.

Genus 23.—HARPANTHUS, Nees.

1. *Harpanthus scutatus*, Web. and Mohr, Spruce. *Jungermania scutata*, Weber and Mohr, Deutchl. Crypt., p. 408.

Hab. On moist banks and on decayed wood, and among the larger hepaticæ. Mt. Eagle, F. W. M. and D. McA., 1881; Connor hill, D. McA., April, 1877; very rare.

Genus 24.—PLAGIOCHILA, Dumort.

1. *Plagiochila asplenoides*, Linn., Dumort. *Jungermania asplenoides*, Linn. Sp., pl. 1597. Hook., Brit. Jung., t. 13. *Plagiochila asplenoides*, Dumort, Rev., Jung., p. 14.

Hab. On shaded banks, in woods, and on rocks. On the W. side of Mt. Brandon, F. W. M. and D. McA., April, 1897; Loughanscaul, Lett and McA., 1898; bank near Inch, Lett and McA., May, 1899; Lough Duff (♂), Lett and McA., 1899.

Var. *minor*, Lindenberg, Plag., p. 111. Carrington, Brit. Hep., part 3, p. 56. Shoots $\frac{1}{2}$ to $1\frac{1}{2}$ inches high, summit decurved, densely caespitose, leaves erecto patent, approximate, sub-secund, roundish; margins strongly reflexed, ciliate denticulate, entire, or emarginate; colesule oblong, mouth subdilatate.

Hab. On banks and on stones, in shaded places. Burnham Wood, D. McA., 1894; Connor hill, F. W. M. and D. McA., April, 1897; between Emalough and Inch, Lett and McA., 1899; Lough Duff, Lett and McA., May, 1899; Derrymore glen, Lett and McA., 1899.

Var. *deveza*, Carrington, Brit. Hepat., part 3, p. 56. Shoots compressed, sub-circinate, $1\frac{1}{2}$ by 2 inches high, 2 or 3 times innovant furcate; leaves secund, roundish, ciliate-dentate, closely imbricated, erect; dorsal margin straight, strongly recurved, ventral projecting backward, so as to form a crest with the opposite leaves; colesule short, oblong, scarcely exceeding the involucreal leaves, and like them densely ciliate at the apex.

Hab. On rocks. Dingle bay, Dr. Carrington, July, 1861.

Var. *humilis*, Lindenberg, Plagiochila, p. 111. Carrington, Brit. Hepat., part 3, p. 56. Scarcely $\frac{1}{2}$ inch long. Shoots attenuate, leaves ovate, entire, obtuse, or notched.

Hab. On damp rocks. Derrymore glen, near Cahirconree. Lett and McA., May, 1899.

2. *Plagiochila spinulosa*, Dicks, Dumort. *Jungermania spinulosa*, Dicks, Crypt-fasc 2, p. 14. Hook. Brit. Jung., t. 14.

Hab. On moist banks, on rocks, and in wood; common.

Var. *inermis*, Carrington. Shoots slender, closely tufted, leaves roundish, ovate, obliquely retuse, or bidentate at the apex, margin recurved, mostly entire.

Hab. On rocks and damp banks; Coumanare lakes, Lett and McA., 1898; Bank near Inch, Lett and McA., 1899; on rocks in the Brandon valley, Lett and McA., 7th June, 1900.

Var. *flagellifera*, Carrington. Most of the branches flagelliferous, intertwined, fastigiate, naked or microphyllous; leaves not much broader than the stems, obovate cuneate, patent, recurvo-convex, scarcely decurrent, 2-3 dentate, stipules frequent.

Hab. On damp rocks and banks; Lough Duff, Lett and McA., May, 1899; Derrymore glen, Lett and McA., 1899; rare.

3. *Plagiochila punctata*, Taylor, in Lond. Jour. of Bot., 1844, p. 371.

Hab. On shady banks among rocks, and in woods; Connor hill, Lindberg and Moore, 1873; D. McA., 1894; Lett and McA., 1898; Mount Brandon, F. W. M. and D. McA., 1881,

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April, 1897; Loughanscaul, D. McA., 1894; Lett and McA., 1898; Mount Eagle lake, Lett and McA., 1898; Maghanaboglen, F. W. M. and D. McA., April, 1897; common in the Brandon valley, Lett and McA., 7th June, 1900; Derrymoreglen, Lett and McA., 1899.

4. *Plagiochila interrupta*, Nees. Dumorb. *Jungermania interrupta*, Nees. Leb. 1, 165; Carring., Brit. Hep., p. 52, t. 3, fig. 11.

Hab. On rocks and banks in shady places; among rocks, Burnham Wood, Lett and McA., 1898; rare.

5. *Plagiochila tridenticulata*, Taylor. *Jungermania spinulosa* b. *tridenticulata*, Hook., Brit. Jung., t. 14, figs. 9 and 10; Moore, Irish Hepat., p. 644.

Hab. On moist peat, and on the larger Hepaticæ, as *Frullania*; Mount Brandon, Dr. Moore; Connor hill, Lindberg and Moore, 1873; on *Frullania Tamarisci*, F. W. M. and D. McA., July, 1881; on *Radula aquilegia*, Loughanscaul, Lett and McA., 1898; Mount Eagle, Lett and McA., 1898.

6. *Plagiochila exigua*, Taylor. *Jungermania exigua*, Tayl. in Trans. Bot. Soc., Edin., 1, p. 179.

Hab. On the trunks of trees near the ground, and on the larger Hepaticæ; Mount Eagle, near the lake, Lett and McA., 1898; Loughanscaul, Lett and McA., 1898; Lough Duff, Lett and McA., 1899.

Genus 25.—CLASMATOCOLEA, Spruce.

1. *Clasmatocolea cuneifolia*, Hook., Spruce. *Jungermania cuneifolia*, Hook., Brit. Jung., t. 64; Eng. Bot. Supp., t. 2700; Spruce, Hepat., Amazonicæ et Andinæ., p. 440; Moore, Irish Hepaticæ, p. 646.

Hab. On damp peat among rocks, and on the larger Hepaticæ; Mount Brandon, on *Frullania*, D. McA., 1875; F. W. M. and D. McA., 1881; Connor hill, on *Frullania*, D. McA., 1875; Lett and McA., 1898; Loughanscaul, Lett and McA., 1898; Lough Duff, in the Brandon valley, very fine on damp rocks, epiphytic on *Frullania*. This singular minute plant, which appears to be confined to the south-west of Ireland, was first found by Miss Hutchins near Bantry, county Cork. It is frequent in the Brandon range, which extends from Brandon head to the top of the pass at Connor hill. Though truly alpine it has been found at various elevations

from 500 feet to 2500 on Mount Brandon. It has never been found in fruit. Dr. Spruce, in his work above quoted at p. 440, writes:—"I cannot doubt that the *Jung. cuneifolia*, Hook., Brit. Jung., t. 64, hitherto known only from sterile specimens, is a true *Clasmatocolea*. Specimens gathered a few years ago on Mount Brandon by McArdle are so like the arcuate barren shoots of *Cl. fragellima* that until I compared them closely I thought them the same species. The Irish plant (like the Andine) has both entire and bifid under-leaves (stipules), and was correctly so described by Nees from original specimens of Miss Hutchins, although Hooker's figure 1 c. and the E. Bot. figure (t. 2700) show only bifid underleaves."

Genus 26.—*JUNGERMANIA*, Linnæus.

1. *Jungermania cordifolia*, Hook. Dumort. *J. cordifolia*, Hook. Brit. Jung., t. 32. Moore, Irish Hep., p. 647.

Hab. On rocks in mountain streams. Connor hill, Dr. Moore; side of the stream which flows from Lough Doon into the Brandon valley, F. W. M. and D. McA., 1881 (very fine, not found there recently); Mount Brandon, Dr. Moore, 1864; Maghanaboglen, D. McA., 1875; Loughanscaul, Lett and McA., Sept., 1898; Barnanaghea lough on wet rocks, very fine ♂, Lett and McA., Sept., 1898.

2. *Jungermania pumila*, With Bot. Arr. 3. 866. Hook, Brit. Jung., t. 17. Moore, Irish Hepat., p. 647.

Hab. On rocks and banks near streams. Connor hill, Dr. Moore; Glen on Mount Brandon, Dr. Moore; Loughanscaul, D. McA., 1894. Margin of Mount Eagle lake, Lett and McA., Sept., 1898; bank between Emalough and Inch, Lett and McA., 1899; Derrymore glen, Lett and McA., April, 1899.

3. *Jungermania lurida*, Dumort. *J. nana*, Nees, Eur., Leb. 1317; *J. lurida*, Dumort, Syll. Jung., p. 50; *Aplonia lurida* Dumort, Hep. Eur., p. 60; *J. nana*, Moore, Irish Hep., p. 648.

Hab. On wet banks among rocks. Connor hill, D. McA., 1875 (rare).

4. *Jungermania sphaerocarpa*, Hook. Dumort, Hook. Brit. Jung. t. 74, p. 61. Moore, Irish Hep. p. 648.

Hab. On stones in wet places, and on damp banks. Connor hill, D. McA., 1875; Lett and McA., 1897; Derrymore glen, near Cahirconree Lett and McA., May, 1899 (rare).

5. *Jungermania riparia*, Taylor, Dumort. Taylor in Trans. Bot. Soc. Edin., p. 43. Moore, Irish Hepat., p. 648.

Hab. In damp places, sides of streams, and among wet rocks. Mt. Brandon, Dr. Moore; Connor hill, Lindberg and Moore, 1873; Maghanaboglen, D. McA., 1875; Loughanscaul, Lett and McA., Sept., 1898 (rare).

6. *Jungermania bantriensis*, Nees Hook. in Brit. Jung. under *J. stipulacea*, t. 41. Moore, Irish Hep., p. 649.

Hab. On damp sandy places among rocks. Mt. Brandon, Dr. Moore (rare).

Var. *acuta*, Lindenberg. Lindberg in Acta. Soc. Sci. Fennica x. p. 528.

Hab. On rocks among *Pagiothecium denticulatum*, Connor hill, Lindberg and Moore, 1873 (rare).

7. *Jungermania orchadensis*, Hook. Lindenberg; Hook. Brit. Jung. t. 71. Moore, Irish Hep., p. 650.

Hab. In damp places on mountains among the larger mosses and Hepaticæ (rare). On the summit of Mt. Brandon among *Hypnum loreum*, Taylor, 1813; Dr. Moore, 1863; on the east side, near the summit, among *Scapania ornithopodioides*, Lett and McA., 6th June, 1900; on Connor hill among *Herberta adunca*, Lindberg and Moore, 1873.

8. *Jungermania barbata* Schreber, Spicil. Lips., p. 107, Hook. Brit. Jung., t. 70; Moore, Irish Hepat., p. 650.

Hab. among rocks and heathy banks. Mount Brandon, F.W.M. and D. McA., 1881, Lett. and McA. 1898. Connor Hill, Lett and McA., 1898, Loughanscaul, Lett and McA., 1898. Derrymore glen, Lett and McA., 1898. Lough Duff, Lett and McA., May 1899.

9. *Jungermania Lyoni*, Taylor, Trans. Bot. Soc. Edin., p. 116, t. 7.

Hab. On rocky banks among mosses. Coumanare lakes, Lett and McA., 1898; very rare.

10. *Jungermania exsecta*, Schmidl., Ic. et Anal., p. 241, t. 62, fig. 2, excel. fig. fruct f. et 19-24, Hook. Brit. Jung., t. 19, and suppl., t. 1. Moore, Irish Hepat., p. 651.

Hab. On damp banks and in woods. Bank near Mount Eagle lake, F.W.M. and D. McA., July, 1881 (rare).

11. *Jungermania ventricosa*, Dicks, Fl. Crypt. 2, p. 14. Hook. Brit. Jung., t. 28.

Hab. On rocky banks and among the larger mosses and hepatics ; Connor hill, Lindberg and Moore, 1873 ; D. McA., 1875. On the West side of Mount Brandon, Lett and McA., September, 1897. Derrymore glen, Lett and McA., May, 1899. Bank between Emalough and Inch, Lett and McA., 1899.

12. *Jungermania alpestris*, Schl. Exs. 2, 59 ; Gott. et Rab. Exs. 120, 264.

Hab. On damp banks among rocks in mountainous places. Connor hill, D. McA., June 1894 ; damp bank on Mount Eagle, Lett and McA., September 1898 ; Derrymore glen, Lett and McA., May, 1899 (rare).

13. *Jungermania incisa*, Schrad. Sammel 2, p. 5 ; Hook. Brit. Jung., t. 10 ; Moore, Irish Hepat., p. 653.

Hab. On damp turfy banks, and on decayed wood. Bogs about Connor hill, D. McA. ; Coumanare lakes, Lett and McA., Sept., 1898. Derrymore glen, Lett and McA., May, 1899 ; Bog between Emalough and Inch, Lett and McA., 1899.

14. *Jungermania capitata*, Hook. Brit., Jung., t. 80.

Hab. On mountain rocks, and on the larger Hepaticæ. Bog, between Emalough and Inch, Lett and McA., 1899 (rare).

15. *Jungermania intermedia*, Lindenberg, Syn. Hep., p. 83.

Hab. damp banks and boggy places. On the shore of Dingle bay, near Ventry, Lindberg and Moore, 1873 ; rare.

16. *Jungermania inflata*, Huds, Dumort, Huds Fl. Angl., p. 511, Hook. Brit. Jung., p. 38.

Hab. On damp peat about heaths and on stones. Bog between Emalough and Inch, Lett and McA., 1899 (rare).

Genus 27.—*NARDIA*, Bennett, Gray.

Section 1.—*MARSUPELLÆ* Dumort. (Gen.).

1. *Nardia emarginata*, Ehrhart. B.Gr. *Jungermania emarginata*, Ehrh. Beitr. 3, p. 80. Hook. Brit. Jung., t. 27.

Hab. On wet rocks and on stones, on banks bordering streams, in sub-alpine places. Common in the peninsula.

Var. *picea*, Carrington, densely cæspitose, stems rigid, leaves patent approximate, orbicular vertically concave, lobes obtuse, connivent, sinus acute, equal to $\frac{1}{2}$ of the length; involucreal leaves larger convolute; involucre short, nearly immersed; cells smaller, colour, glossy pitch-black dioicious.

Hab. On wet rocks. Connor hill, Lett and McA., September, 1898.

Var. *major*, Carrington. Shoots $1\frac{1}{2}$ to 3 inches by a line in diameter, compressed; stems rigid, sub-ligneous; leaves rather distant, patent-divergent, less concave, cordate emarginate, rounded and reflexed at the base, colour olive, olive-brown or purple, sometimes nearly black, polished.

Hab. On wet rocks and marshy places. Connor hill, D. McA., May 1894.

Var. *minor*, Carrington. *Sarcoscyphus Ehrhartii*, var. *julacea*, Nab. E. Leberm Eur. 1, p. 125. Smaller and more gracile than the type, shoots sub-terete; leaves more closely imbricated, erecto-patent, sub-complicate, round or sub-quadrate, lobes bluntly apiculate, margin nearly plane, olive-brown, or fawn-coloured, sometimes livid green.

Hab. On exposed rocks. Lough Adoon, Lett and McA. September, 1897 (rare).

2. *Nardia sphacelata*, Giesecke. *Jungermania sphacelata*, Giesecke in Lindenberg's Syn. Hep., p. 76, t. 1, fig. 9. *Nardia sphacelata*, Carrington, Brit. Hep., p. 11, Pl. 2, fig. 5.

Hab. On wet rocks in mountain streams. Loughanscaul, D. McA., May, 1894; Derrymore glen, Lett and McA., 1899.

Section 2.—EUCALYX, Lindberg.

3. *Nardia crenulata*, Smith, Lindberg. *Jungermania crenulata*, Smith, Eng. Bot., t. 1463. Hook. Brit. Jung., t. 37. Moore, Irish Hepat., p. 647.

Hab. On moist clay banks, and on hard ground, common. A curious red coloured form, grows on the hard ground, and on stones at Connor hill, and among the rocks about the Coumanare lakes, material collected imperfect; it may prove to be distinct from the type.

4. *Nardia gracillima*, Smith, Lindberg. *Jungermania gracillima*, Smith, Eng. Bot., t. 2238. Hook. Brit. Jung. at description, t. 37.

Hab. On moist clay banks on the hard ground by roadsides, and among stones. Mount Brandon, F.W.M. and D. McA., April, 1897; Connor hill, D. McA., 1894; Lett and McA., 1898. Maghanabo glen, F.W.M. and D. McA., April, 1897; Loughanscaul, Lett and McA., 1898; Coumanare lakes, Lett and McA., 1898; Lough Duff, Lett and McA., 1899.

5. *Nardia hyalina*, Lyell. *Jungermania hyalina*, Hook. Brit. Jung., t. 63.

Hab. On moist banks, and on rocks. Mount Brandon, William Wilson, 1823; Connor hill, William Wilson, 1823; Mt. Brandon, F.W.M. and D. McA., 1881; between Emalough and Inch, Lett and McA., 1899.

6. *Nardia obovata*, Nees, Carrington. *Jungermania obovata*, Nees, Eur. Leberm. 1, p. 332, 2, p. 474; Moore, Irish Hep., p. 657.

Hab. On moist rocks and banks of streams among stones. Connor hill, F.W.M. and D. McA., 1881; Lett and McA., 1898; Mount Brandon, D. McA., 1895; Lough Duff, Lett and McA., May, 1899; Mount Eagle, F.W.M., and D. McA., 1881; Coumanare lakes, Lett and McA., 1898.

Var. minor, Carrington, Brit. Hep., p. 33. Irish, Crypt, p. 21, pl. 2, fig 1; shoots crowded, $\frac{1}{2}$ inch long, leaves ovate, sub-squarrose, upper ones saccate; capsule spherical; Connor hill, Dr. Moore, 1863.

Section 3.—*MESOPHYLLA*, Dumortier.

7. *Nardia compressa*, Hook. B. Gr. *Jungermania compressa*, Hook. Brit. Jung., t. 58.

Hab. On wet rocks which are often sprayed or submerged. Near the summit of Barnanaghea, plentiful, Lett and McA., September, 1898; rare.

8. *Nardia scalaris*, Schrader, B. Gr. *Jungermania scalaris*, Hook. Brit. Jung., t. 61.

Hab. On banks of streams, and on wet rocks; common.

Var. *compressa*, Carrington, Brit. Hep., p. 24. *Jungermania Walrothiana*, Huben. 1, c. p. 85; stems short, erect rigid, leaves orbiculate, plane, near the apex more crowded and compressed, stipules broadly subulate patent, involueral bracts larger, entire, connivent, pale green.

Hab. Among wet stones. Connor hill, Lett and McA., September, 1897.

Var. *distans*, Carrington, Brit. Hep., p. 24. Stems elongated, leaves distant, more convex, erecto-patent, ventricose, sordid green, shrinking when dry.

Hab. In wet places. Mount Brandon, Lett and McA., June, 1900; very distinct, and may be taken for *J. sphaerocarpa*.

Genus 28.—*SACCOGYNA*, Dumortier.

1. *Saccogyna viticulosa*, Mich., Dumort. *Jungermania viticulosa*, Mich. Nov., pl. Gen., p. 8, t. 5, fig. 4, 1729. Hook. Brit. Jung., t. 60. Moore, Irish Hep., p. 633.

Hab. On damp ground, rocks, decayed wood and among mosses; common.

Genus 29.—*GYMNOMITRIUM*, Corda.

1. *Gymnomitrium coralloides*, Nab. E., Europ. Lebern 1, p. 418. Carrington, Brit. Hep., p. 7, t. 1, fig. 4. McArdle, new or rare, Irish Hepatica, Proc. R.D.S., vol. 3, pl. 5, fig. 1, 1880.

Hab. On rocks in mountainous places. Mount Brandon, Dr. Moore, 1840.

2. *Gymnomitrium orenulatum*, Gottsche, Carrington, Brit. Hep., p. 9, t. 1, fig. 3.

Hab. On mountain rocks. In the fissures of rocks. Connor hill, Lindberg and Moore, 1873; F.W.M. and D. McA., 1881. On the west side of Mount Brandon, F.W.M. and D. McA., April, 1897; Lett and McA., 1900.

Sub-tribe—*FOSDOMBRONIE*.

Genus 30.—*SCALIA*, Lyell, Gray.

1. *Scalia Hookeri*, Lyell, B. Gr. *Jungermania Hookeri*, Lyell in Sm. Eng. Bot., vol. 36, t. 2555. *Jungermania Hookeri*, Hook. Brit. Jung., t. 54; Moore, Irish Hep., 660.

Hab. On damp sandy places. Connor hill, near the mouth of the pass, among *Riccardia pinguis*, var. β , a solitary female plant, sterile, S.O., Lindberg, 1873. Dr. Moore, in his work above quoted, states that this is the only instance of authority for inserting this as an Irish plant.

Genus 31.—*Fossombronina*, Raddi.

1. *Fossombronina angulosa*, Raddi, Dicks. *Jungermania angulosa*, Dicks Fasc., pl. Crypt. Brit. 1, p. 7. Moore, Irish Hep., p. 661.

Hab. On ditch-banks, and in fissures of rocks near the sea. Ditch-banks near the sea at Dingle bay, Lindberg and Moore, 1873. Very fine on a ditch-bank at the quarry, near the mouth of Dingle Harbour; F.W. Moore, April, 1897. On cliffs near the sea, between Dingle and Ventry; Lindberg and Moore, 1873. Burnham Wood, Lett and McA., September, 1898.

2. *Fossombronina pusilla*, Linn. *Jungermania pusilla*, Linn Sp., Pl., p. 1603, Hook. Brit. Jung., t. 69. Moore, Irish Hepat., p. 661.

Hab. On moist clay soil, near Dingle, Dr. Moore, 1875. In the fissures of rocks between Dingle and Ventry, with *Anthoceros laevis*, Lindberg and Moore, 1873. Bank in Burnham Wood near the sea, Lett and McA., September, 1898. Wet bank between Emalough and Inch, Lett and McA., May, 1899.

Genus 32.—*Pallavicinia*, B. Gr.

1. *Pallavicinia Lyellii*, Hook., B. Gr. *Jungermania Lyellii*, Hook. Brit. Jung., t. 77; Moore, Irish Hep., p. 661.

Hab. In boggy places on the ground, and on Sphagnum. Maghanabo glen; Dr. Moore, 1865. Lakes between Maghanabo glen and Fermoy; Dr. Moore, 1865; rare.

Genus 33.—*Blasia*, Micheli.

1. *Blasia pusilla*, Linn. Sp., pl. 1605. *Jungermania Blasia*, Hook. Brit. Jung., t. 82-84.

Hab. On wet banks among dripping rocks, &c. At the base of Mount Brandon, Dr. Moore, 1865; F.W.M. and D. McA., 1881. Connor hill, Lett and McA., September, 1898. Lough Duff, Lett and McA., 1899.

Genus 34.—PELLIA, Raddi.

1. *Pellia epiphylla*, Linn. *Jungermania epiphylla*, Linn. Sp., pl. 1, ed. 2, p. 1135; Hook. Brit. Jung., t. 47, figures 1, 4, 8, 17.

Hab. On moist clay banks and on boggy places, from sea level to high elevations; common.

Var. *endivifolia*, Dicks. *Jungermania endivæfolia*, Dicks, Crypt 4, p. 19; Fronds elongated, broadly linear, fruit terminal and lateral.

Hab. On wet rocks, Connor hill, Lett and McA., 1897.

2. *Pellia calycina*, Nees, Eur., Leb. 3, p. 386. *Jungermania epiphylla*, var. *furcigera*, Hook. Brit. Jung., t. 47, fig. 18, et 2, 3, 9, 10, 12.

Hab. In rocky wet places, often submerged. Mount Brandon, F.W.M. and D. McA., September, 1897; Lough-anscaul, on wet rocks, Lett and McA., September, 1898.

Sub-tribe.—METZGERIÆ.

Genus 35.—METZGERIA, Raddi.

1. *Metzgeria furcata*, Linn. *Jungermania furcata*, Linn. Sp., pl. 1602; Hook. Brit. Jung., t. 55-56; Moore, Irish Hep., p. 665; Lindberg, Monog. Metz., p. 35.

Hab. On the trunks of trees, on rocks and banks; common.

Var. *æruiginosa*, Hook. *Metzgeria furcata*, var. *fruticulosa*, Lindberg, Monog. Metz., p. 40. Tufts minute, crisped, of a bright green colour, fronds fiat, upper half digitately ramose ascending, the apex reduced to the nerve of a striking blueish colour, fruit unknown; it may be a distinct species.

Hab. On the trunks of trees. Woods between Dingle and Ventry, D. McA., 1894. Burnham Wood, D. McA., 1894. On trees at the river-bank, Ventry, D. McA., 1894.

2. *Metzgeria hamata*, Lindberg. *Jungermania dichotoma*, Swz. mss., p. nec. Prod., nec. Fl., Ind. occ.; *Metzgeria hamata*, Lindberg, Monog. Metz., p. 25, fig. 5.

Hab. On the ground on damp mossy banks, and by the sides of streams, often submerged. A very fine species. In Irish specimens fruit unknown, easily detected by large size mode of growth, and above all by the remarkable marginal

hooked cilia. Lake near the summit of Mount Brandon, Dr. Moore, 1865; Lett and McA., 1897. On the ascent to Mount Brandon, near Clohane, F.W.M. and D. McA., 1881. Mount Eagle, F.W.M. and D. McA., July, 1881. Banks of the Coumanare lakes, Lett and McA., 1898; Loughanscaul, Lett and McA., September, 1898.

3. *Metzgeria conjugata*, Dill, Lindberg. Dill. Musc., t. 74, f. 45, Lindb. Monogr. Metzg., p. 29, f. 6. McArdle, Musci and Hep., Co. Cavan Proc. R.I.A., 3rd ser., vol. 4, No. 5, p. 616. pl. 22, figs. all excepting 4, which is a proliferous form Moore, Irish Hep., p. 666. Differs from the other known species by its monocious inflorescence.

Hab. On the trunks of trees and on rocks. Connor hill, F.W.M. and D. McA., July, 1881; Loughanscaul, Lett and McA., 1898; Burnham Wood, Lett and McA., 1898; Mount Eagle, Lett and McA., 1898. On the west side of Mount Brandon, F.W.M. and D. McA., April, 1897. On rocks, Derrymore glen, Lett and McA., 1899. On the trunks of trees near Inch (fertile), Lett and McA., May, 1899.

Genus 36.—RICCARDIA, Bennett, Gray.

1. *Riccardia multifida*, Linn., B. Gr. *Jungermania multifida*, Linn. Sp., pl. 1602. Hook. Brit. Jung., t. 45; Moore, Irish Hep., p. 667.

Hab. In marshy places, and on decayed wood, Mount Brandon, west, Lett and McA., September, 1897; Connor hill, Lett and McA., 1897; Burnham Wood, Lett and McA., 1898; Anascaul, Lett and McA., 1898; Barnanaghea, Lett and McA., 1898; Lough Duff, Lett and McA., 1899; Derrymore glen, Lett and McA., 1899.

Var. *ambrosioides*, Nees, Syn. Hep., p. 497; under *Aneura*.

Hab. In marshy places, and among Sphagnum. Near Ventry, Lindberg and Moore, 1873; Connor hill, Lindberg and Moore, 1873.

2. *Riccardia palmata*, Hedw. *Jungermania palmata*, Hedwig Theor. Gen. 1, ed., p. 87, t. 18, figs. 93, 95, et t. 19, figs. 96, 98; Moore, Irish, Hepat., p. 668.

Hab. On decayed wood; Mount Brandon, west, F.W.M. and D. McA., 1881; Connor hill, D. McA., 1875; Lough

Adoon, Lett and McA., 1897; Loughanscaul, Lett and McA., 1897; Barnanaghea lough, Lett and McA., 1898; Mount Eagle, Lett and McA., 1898.

3. *Riccardia latifrons*, Schmidel, Lindberg. *Jungermania multifida*, Schmid. Ic., pl. 3, p. 213-216; excel. Synon, 1797; Hook. Brit. Jung., t. 45, figs. 4, 7, et 12.

Hab. Wet boggy places, sides of rivulets; Anascaul, D. McA., 1894; Lett and McA., 1898; Lough Adoon, D. McA., 1894; Coumanare lakes, Lett and McA., September, 1898; Barnanaghea lough, Lett and McA., 1898; Lough Nalachan, Lett and McA., 1898; rare.

4. *Riccardia pinguis*, Linn., B. Gr. *Jungermania pinguis*, Linn. Sp., pl., p. 602; Hook. Brit. Jung., t. 46; Moore, Irish, Hep., p. 668.

Hab. In marshy places, among mosses, and on decayed wood; Connor hill, Lett and McA., 1897; Coumanare lakes, Lett and McA., 1898; Maghanabo glen, F.W.M. and D. McA., April, 1897; Anascaul, D. McA., 1894; bog between Emalough and Inch, Lett and McA., 1899; Mount Brandon, Lett and McA., 6th June, 1900.

Var. *denticulata*, Nees, Lindberg in Acta Soc. Sci., Fenie x p. 514.

Hab. Among *Cylicocarpum Mougeoti*, Connor hill, Lindberg and Moore, 1873.

Sub-order.—MARCHANTIACEÆ.

Genus 37.—MARCHANTIA, Micheli.

1. *Marchantia polymorpha*, Mich., Nov., pl. Gen., t. 1, figs. 1, 2, 5, Linn. Sp., pl. 1603; Eng. Bot., t. 100.

Hab. In moist shaded places, sides of drains, old walls, &c.; common.

Genus 38.—CONOCEPHALUS, Neck.

1. *Conocephalus conicus*, Neek, Dumort. *Marchantia conica*, Eng. Bot., t. 504.

Hab. Damp shaded places, banks of lakes and rivers; common.

Genus 39.—LUNULARIA, Micheli.

1. *Lunularia cruciata*, Linn, *Lunularia vulgaris*, Mich. Nov. Gen. 4^t. 4.

Hab. On damp ground, old walls, &c. Old walls about Dingle, D. McA.; Burnham Wood, Lett and McA., 1898; bank between Emalough and Inch, Lett and McA., 1899; roadside, Connor hill, D. McA.; old walls about Clohane and Fermoy, Lett and McA., June, 1900; common.

Genus 40.—DUMORTIERA, Nees.

1. *Dumortiera hirsuta*, Swartz, var. *irrigua*, Taylor, Sps., Spruce Hep., Amazon et Andine, p. 566; *Marchantia irrigua*, Wilson, in Hook. Eng. Fl. 5, 1, p. 106; *Hygrophilla irrigua*, Taylor, in Fl. Hib., p. 54; Moore, Irish Hep., p. 602.

Hab. In the rocky recesses of mountain streams near waterfalls; Maghanabo glen, William Wilson, 1829, D. McA., 1875, F.W.M. and D. McA., April, 1897. On wet rocks in the mountain stream, which flows into Loughanscaul, Lett and McA., September, 1897.

Sub-order.—ANTHOCEROTACEÆ.

Genus 41.—ANTHOCEROS, Micheli.

1. *Anthoceros punctatus*, Linn. Sp., pl. 1606; Eng. Bot., t. 1537; Moore, Irish Hep., p. 670.

Hab. Ditch banks, and by the sides of streams; Mount Brandon, William Wilson, 1829; Maghanabo glen, D. McA., 1875; F.W.M. and D. McA., 1881, April 1897; near Brandon head, Lett and McA., September 1898.

2. *Anthoceros laevis*, Dill, L., Linn. Sp., pl. 1606; Eng. Bot., t. 1538, under *A. major*, Mich. Gen. 2, t. 7, fig. 1, Moore, Irish Hep., p. 670.

Hab. On clay banks, and on the hard ground of garden paths. On a wet clay bank by the roadside, leading from Dingle to Ventry, left hand-side of the road, about a mile and a-half from Ventry, Lindberg and Moore, July, 1873. On a pathway in Burnham Wood, Ventry, Lett and McA., September, 1898.

Sub-order.—RICCIACEÆ.

Genus 42.—RICCIA, Micheli.

1. *Riccia sorocarpa*, Bishoff, in Nov. Act. Nat. Cur. 17, p. 1053 to 71, fig. 11; Lindberg, in Acta. Soc. Sci. Fenic x. p. 471; Moore, Irish Hepaticæ, p. 606.

Hab. In fissures, and tops of old walls; on an old wall near Dingle, Lindberg and Moore, 1873; wall top by the roadside, leading from Dingle to Ventry, the Dingle side of the river near the Union, Lett and McA., September, 1898; very rare.

[DESCRIPTION OF PLATES

DESCRIPTION OF PLATES.

PLATE XVI.

Lepidoxia Pearsoni, showing spicate androecia at apex of lateral branch. Leaves and stipules, and branching habit of plant $\times 40$ diameters. Drawn from specimens collected at Lough Duff, in the Brandon valley, Co. Kerry.

PLATE XVII.

Scapania nimbosa.

Fig.

1. Antical view of portion of stem $\times 8$ diameters.
2. Amplexicaul leaf with cilia, which are often uncinata $\times 30$.
3. Antical lobe of same $\times 30$. Drawn from specimens collected at Moidart, West Inverness, by S. M. Macvicar, Esq., 1898.

Scapania ornithopodioides.

Fig.

4. Antical view of portion of stem $\times 8$.
5. Postical leaf, showing ciliate-dentate margins $\times 30$.
6. Antical leaf $\times 30$.
7. Auricle of antical leaf $\times 120$.
8. Apex of shoot, which bears adventitious buds.
9. Adventitious buds $\times 175$. Drawn from plants collected on Mount Brandon, Co. Kerry, June, 1900.

XX.

THE FOURTH REPORT ON THE PREHISTORIC REMAINS
FROM THE SANDHILLS OF THE COAST OF IRELAND.
BY W. J. KNOWLES.

(PLATE XVIII.)

[Read FEBRUARY 25, 1901.]

IT is five years since I contributed my Third Report on "Prehistoric Remains from the Sandhills of the Coast of Ireland" to the Academy's *Proceedings*, and as a great deal of further investigation has taken place during that time I think that a Fourth Report is the best method of conveying to the public the knowledge that has since been obtained.

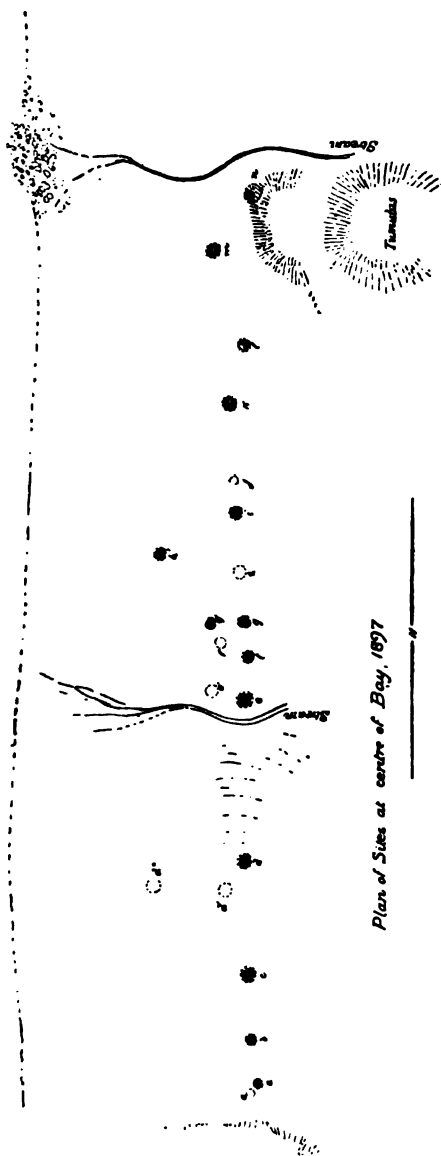
My previous reports embraced Whitepark Bay and Portrush in county Antrim; Grangemore and Portstewart in county Derry; Dundrum, county Down; Horn Head, Ballyness and Bundoran, county Donegal; Achill Island and Killala in county Mayo, with several minor stations lying outside and between these principal settlements. My three previous reports gave a survey extending from Malahide on the east coast round the north and west as far as Galway. Several new and very interesting sites within this extent of coast have been found and investigated during the past five years, and a search for similar prehistoric settlements has been made along the coast south of Galway, as also on the east side of Ireland south of Dublin, which has been crowned with considerable success. Besides the discovery of new sites the more important of those previously reported on have been often examined not only by myself but by a rapidly increasing number of new and enthusiastic investigators.

I shall first give an account of the work done in the sites which were the subject of previous reports, and then describe the new places which have been found since my last report appeared.

WHITEPARK BAY, COUNTY ANTRIM.

This being one of the most important and instructive stations has received constant attention from myself and several members of my

family. It has become so well known that investigators not only from other parts of Ireland but from England have visited and inspected the prehistoric settlements, and some of these have communicated to me the results of their inspection, and given me lists and figures of the objects they have found. Other ladies and gentlemen have visited Whitepark Bay under my own guidance. In the autumn of 1896 I conducted Professor Haddon, F.R.S., over the sites when he obtained over fifty manufactured flint implements. A little later in the same year I went with Mr. George Coffey, M.R.I.A., to the same sites, and also to those at Portstewart, and on excavating portions of the old surface, where still covered and intact, he got a considerable number of flint implements, fragments of pottery, and other remains. Miss Edith Oldham, of Dublin, and Mr. Alexander D'Evelyn, M.D., of Ballymena, also accompanied myself and my daughters to Whitepark Bay in the same year, and they likewise were rewarded by finding implements, some of which, as compared with other implements found in this place, showed superior workmanship. It was then considered advisable by those who had thus got a glimpse of this important Neolithic settlement and manufactory of flint implements to have a further and more extensive investigation, and the Easter week of 1897 was settled on for the purpose. Colonel Plunket, Director of the Science and Art Department, Dublin; Professor Haddon, Mrs. Haddon and Mr. Ernest Haddon, Mr. and Mrs. George Coffey, and Master Coffey, Miss Edith Oldham, with myself, my wife, and three daughters formed the party. The two most youthful members, Masters Haddon and Coffey, were as enthusiastic as their seniors, and almost as successful in their finds. We made Ballycastle our headquarters, and drove daily to the sand-hills for six successive days. Work was carried on from eleven till five o'clock each day, examining, digging, photographing, and mapping sites. I believe I am correct in saying that the information conveyed in my previous reports regarding Whitepark Bay was fully verified and confirmed. Over five hundred manufactured flint implements were obtained by the party on this occasion, consisting of varieties of scrapers, a few arrow heads, knives, hollow scrapers, and dressed flakes, besides fragments of pottery, bones, teeth, and shells. Many important photographs of sites and surroundings were taken by Professor Haddon and Mr. Coffey. They also mapped the sites of the various huts which were plainly indicated on the sand by the stones which had been used for hearths. In a later visit to this place Mr. Coffey checked the previous mapping, and finally settled the positions which are shown on the map opposite. The portion which has been bared of sand and sward,



Plan of Sites at centre of Bay, 1897



Plan of Sites at East end of Bay, 1897

Plan of Sites—Whitepark Bay. Scale 300 feet to one inch. Average diameter of Sites 18 to 20 feet.

so as to expose to view the original hut sites, with flakes, cores, hammerstones, broken bones, shells, and other evidence of the handiwork and daily life of the prehistoric people in this place, is small compared with the parts which are still covered with sand and sward, but this sandy covering will no doubt be blown away at some future date, when more sites will be exposed.

An interesting find of a human skeleton in the centre of a hut-site was made by my daughter when assisting Professor Haddon and Mr. Coffey in taking photographs. The skeleton was that of an adult man, and was lying on the left side with the head to the south, and looking westward, arms flexed, hands up to chin, legs flexed, knees between the elbows. The humerus was $12\frac{1}{2}$ inches, radius $9\frac{1}{2}$ inches, ulna $10\frac{1}{2}$ inches, femur estimated 18 inches. The skeleton was exposed by careful removal of the sand, and several photographs were taken, one of which, by the kindness of Mr. Coffey, is here reproduced (see Plate XVIII.). The skeleton was then covered up, and hopes were entertained that it might have been possible to remove it entire in the state in which it was when it was discovered, to the Museum in Dublin, but when this could not be satisfactorily accomplished my daughter brought away the skull, which was now more broken than it was when found. The fragments were nearly all forthcoming, and Mr. Coffey has been able to put them together, and restore the skull sufficiently to allow Professor Haddon to measure it. I shall give the various measurements in Professor Haddon's own words, from which it will be seen that it is a typical Neolithic skull, and, therefore, there cannot be much doubt that it belonged to one of the settlers who made the flint implements found around the hut-sites in the sandhills. His notes and measurements are as follows:—

“The specimen is much broken; several pieces of the cranium, and practically the whole of the face, are wanting, and, in consequence, one cannot be certain that the contours are quite correct.

“The cranium is that of an adult man. Viewed from above the contour falls into the ovoides group of sergi, and, indeed, bears some resemblance to the Oldbridge cranium I [described three years ago.]¹ The parietal region is fairly well filled. There is no sagittal crest, but there is a slight sagittal groove between the parietal eminences. The frontal sinuses and glabella are well marked. Viewed from behind, the side walls of the cranium are straight, and slant slightly outwards

¹ “Studies in Irish Craniology: III.—A Neolithic Cist buried at Oldbridge, county of Meath,” *Proc. Roy. Irish Acad.* (3), Vol. iv., p. 570.

superiorly; the cranial vault is rounded. The inion is moderately large and the muscular impressions of the occipital are fairly well marked.

"The sutures are complex, and none are obliterated; there is a wormian bone (22 by 15 m.m.) in the lambdoial suture on the left side.

"The following are all the measurements I have been able to make of the cranium, but I must again point out that owing to its fractured state and the absence of numerous fragments the measurements cannot be absolutely relied upon :—

"Gabello-occip. length, 192; ophyro-occip. length, 188; maximum (parietal) breadth, 140; minimum frontal breadth, 92; basio-bregmatic height, 145; frontal sagittal arc, 125; parietal sagittal arc, 143; occipital sagittal arc, 119; nasio-opisthial arc, 387; foramen magnum length, 36; basio-nasial length, 101; total sagittal circumference, 523; bi-auric. breadth, 121; auriculo-bregmatic arc, 309; horizontal circumference, 518; auriculo-nasal radius, 96; auriculo-bregmatic radius, 126; auriculo-parietal radius, 129.

"The length-breadth index is 72·9; the length-height index is 75·6; the breadth-height index is 103·6; taking the auriculo-radial measurements, the length-height (bregmatic) index is 65·6, and the breadth-height (bregmatic) is 90. The cranium is therefore dolichocephalic and metriocephalic, or, according to the breadth-height index, orthostencephalic.

"It is unfortunate that the face is wanting, as the nasal and orbital indices are of great importance; but although the specimen is so imperfect I have little hesitation in stating that I consider this to be a fairly typical example of a cranium of the Iberian group of the Mediterranean race. In other words, it is an example of the race that was dominant during the Neolithic Stage of Culture. The typically contracted position of the body, and the fact of it resting on one side afford presumptive evidence that the interment was an early one and probably contemporary with the settlement."

Scarcely any implement different in character from those previously described and figured were obtained during the investigation referred to. Scrapers of various kinds were the most numerous. The other finds consisted of a few knifelike flakes of the kind which are worked over the back, and locally known as "slugs." Also a few knives and choppers with an edge made by the intersection of two facets, like that of the kitchen midden axe. Bones smoothed and pointed for pins, tines of red deer smoothed, cut and pointed, fragments of pottery both plain and ornamented, hammerstones, cores and flakes were also met with, some of them occurring in great abundance.

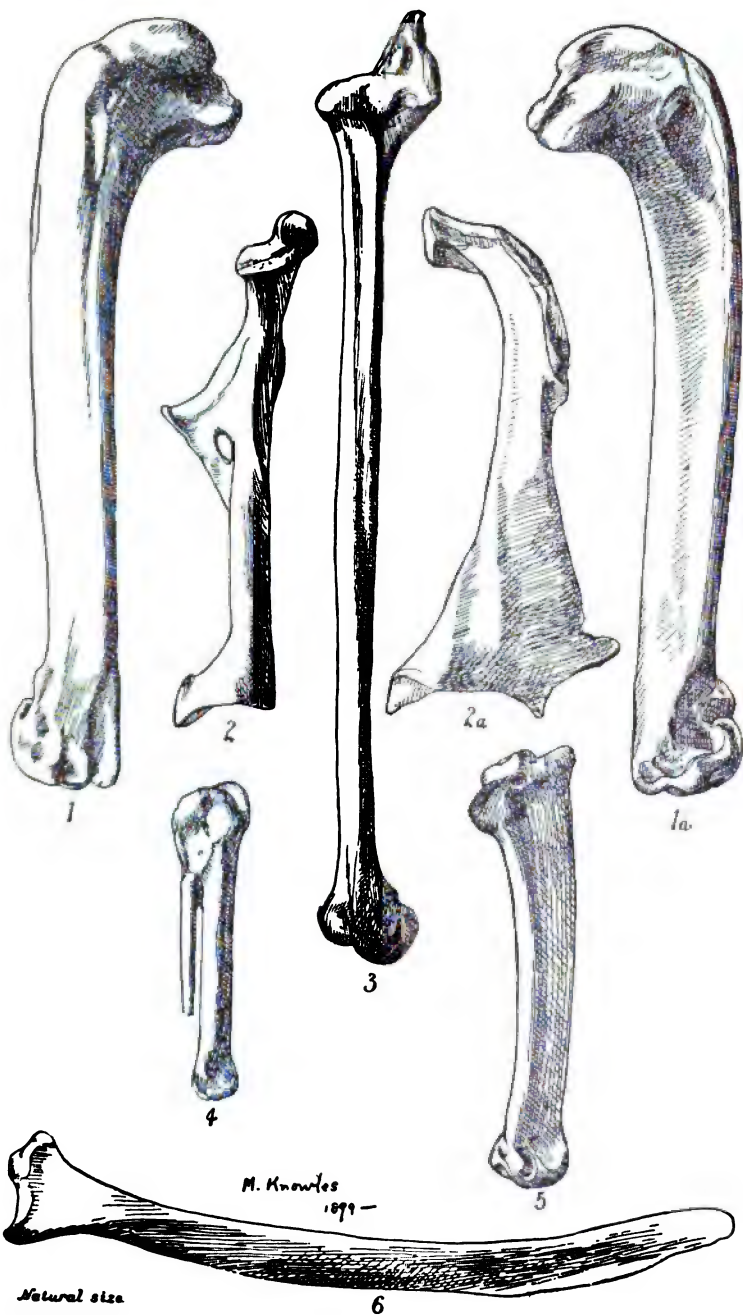
In March, 1898, Mr. Coffey expressed a wish to obtain samples of the prehistoric surface with its flints and other remains. In the procuring of these I was able to assist him, and they are now exhibited in cases in the Science and Art Museum, Dublin.

Professor Newton, of Magdalen College, Cambridge, and Dr. Gadow, of the Museum of Zoology, Cambridge, have kindly determined several parcels of bones; but these were found so far as Whitepark Bay was concerned, with the exception of the Gannet, which I think was not previously determined, to be mostly a confirmation of species given in former reports. Professor Newton was so impressed with the number of bones of the Great Auk which had been recovered at Whitepark Bay, that he came, in June, 1899, to examine the place where the bones had been found. I accompanied him on his visit, and he expressed himself greatly pleased and interested. We were fortunate enough to find on that occasion one bone of Great Auk, the lower end of a tibia. We were in doubt as to whether there could have been a breeding-place of this bird near Whitepark Bay; but, in Professor Newton's opinion, none of the numerous small islands in the immediate neighbourhood of the bay could possibly have been selected by a bird which, like *Alca impennis*, was unable to fly. The nearest suitable place, he considered, was the Skerries, at Portrush; and he wrote me afterwards, that since his visit he had desired Mr. Barret-Hamilton to examine the Skerries and see if he agreed with this view, and he added that Mr. Barret-Hamilton had since informed him that the Skerries, at Portrush, would fulfil all the conditions of a breeding-place for the Great Auk. I show a number of bones of this bird found in Whitepark Bay in No. I.¹

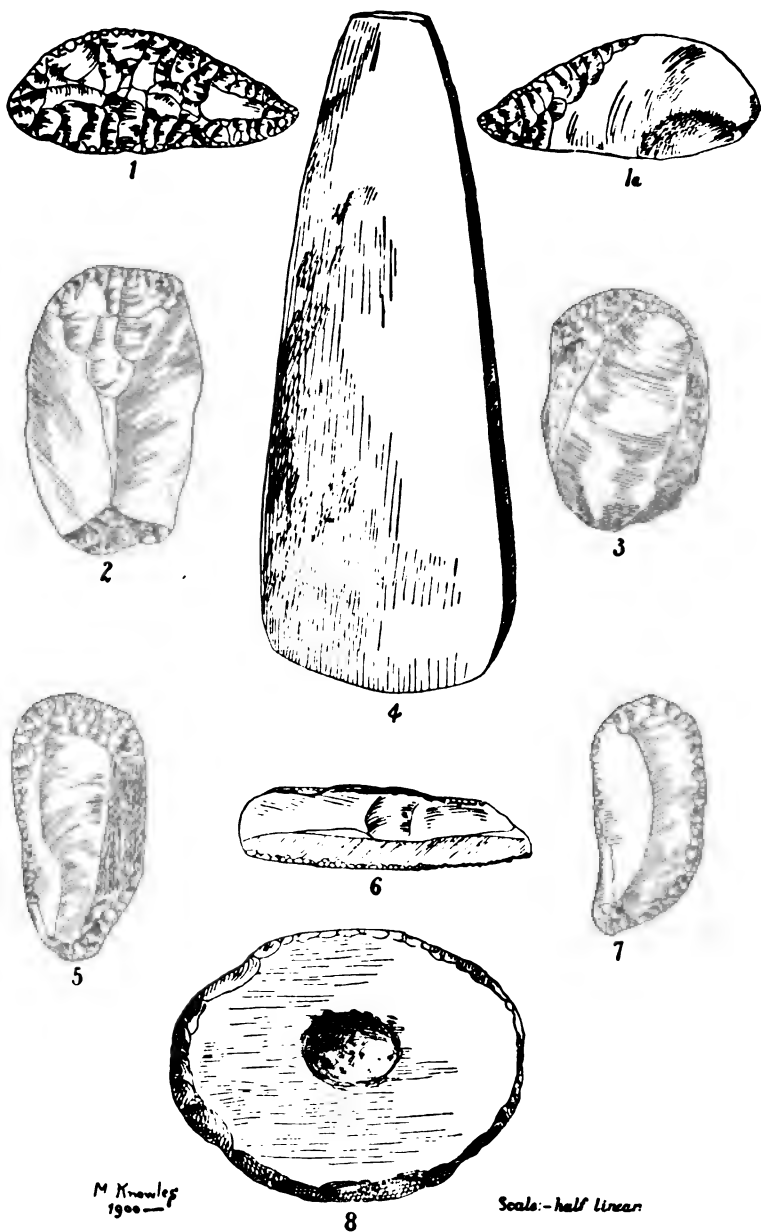
PORTSTEWART, COUNTY DERRY.

Though frequent visits have been made to this station, and various portions of the prehistoric surface excavated, no finds of greater importance than those previously described and figured in my other reports were made. Mr. Coffey found the greater portion of a vessel of the usual coarse, hand-made pottery, with several dressed flakes and other manufactured flint objects, all in close proximity. My daughter also found, whilst digging, a piece of pottery with a portion of the shell of a hazel nut adhering to the inside. On a place from which the sandy covering had not been long previously blown away, thus leaving the old surface exposed, my son and daughter found each an arrow-head.

¹ Fig. 1. 1 α humerus, 2. 2 α coracoid, 3 tibia, 4 left metacarpus, 5 ulna, 6 scapula.



No. I.—Bones of the Great Auk, Whitepark Bay.



No. II.—One find, inside a hutsite, Dundrum, County Down.

GRANGEMORE, COUNTY DERRY.

Several excursions were also made to this place, which lies opposite Portstewart. These two stations may be looked on as one, as they are only separated by the river Bann. My wife, son, and daughter, on the occasion of an excursion to this place, in company with Mr. Coffey, found a number of minute borers of flint. They were first noticed by Mr. Coffey, who drew the attention of the others to his find, and then they all searched diligently and found within a radius of a few yards over 150 of these minute objects. The finding of so many on such a small space would lead to the belief that this was a place where small borers had been manufactured, or else that a workman using such implements had located himself on this spot. Some of these borers show signs of wear at the point, as though they had been used in drilling, and discarded when worn. Several examples are shown, natural size, on No. VIII., figs. 55 to 61, p. 363.

DUNDRUM, COUNTY DOWNS.

I have not in previous reports figured any objects from Dundrum; but the finds from this place have been very numerous, and, as some of the articles are of interest, I have had a series of them drawn, in order that they may appear as illustrations in the present report. After giving an account of my first finds in this place to the British Association at Sheffield in 1879, which was published *in extenso* in *The Belfast News-Letter* and *Northern Whig*, I was invited by the Marchioness of Downshire to go over the sites with her, Lord and Lady Arthur Hill, and other friends. I found that Lady Downshire had collected a considerable number of flint instruments from the sites which surround Murlough, her residence on the Dundrum sandhills, and that she was on the alert to secure any further finds that turned up. I have not, therefore, done more than give the sites at Dundrum a passing inspection since that time. Other archæologists have, however, continued to explore the sandhills at Murlough, and also those at Ballykinler, on the opposite side of Dundrum Bay, and have found many interesting articles of flint and other material. I may mention W. H. Patterson, M.R.I.A.; George Coffey, M.R.I.A.; Mr. H. S. Ward, of Dublin; and Rev. W. A. Adams, of Antrim. I understand Messrs. Coffey and Ward made a visit to Dundrum sites in 1899, and found

arrow-heads and scrapers of flint, axes of black rock, and also pottery. They found a well-marked hut-site, with old surface undisturbed, which they excavated, and obtained an interesting series of objects. I show in No. II. a stone axe and some knives and scrapers of flint which I excavated from a hut-site in these sandhills in one of my early visits, and I presented all the objects, with the exception of the anvil stone (fig. 8) which was found with them, to the Marchioness of Downshire, and they are now in her collection. The axe shown in fig. 4 is a nicely-polished stone axe of greenish colour, which apparently had never been used after having been finished. The knife (fig. 1, 1a) is nicely dressed on one side and only partially dressed on the other. The scrapers shown in figs. 3 and 5 are of a somewhat larger size than those usually found on these sandhills, and the knife-like object shown in fig. 6 is dressed on one of the long edges, and shows very little dressing on the other. Judging from the way in which similar flint knives, found in the lakes of Switzerland, are mounted, it is probable that this implement had the rough or upper edge in the figure inserted in a handle of wood, bone, or horn, leaving the better-dressed edge free for cutting purposes. The anvil stone (fig. 8) was found with them, besides other ruder objects (figs. 2 and 7), and some flakes and cores. All were found in the old hearth, about $2\frac{1}{2}$ yards in diameter, which was composed of dark carbonized material accumulated from repeated fires. One of the flints showed the cracked appearance of that substance when burned in the fire (see fig. 7). I got from the sites in these sandhills during the first two days' exploration over 2000 manufactured objects in flint, consisting of scrapers, which, as is usual in all the sites, were largely in the majority, arrow-heads, flakes dressed as knives, concave scrapers, and anvil stones, showing the pitting sometimes on one side, but oftener on both. The series of these implements which was found shows the pitting ranging from the first slight puncture on some specimens up to pretty deep hollows in others (see examples in figs 116 to 118, No. XIV., p. 381). Stone celts in the polished state, pottery, and the usual broken and split bones of ox, deer, &c., and also shells were obtained.

I show in fig. 9 a rude and partially-made object of coarse-grained rock. One side is well dressed to a flat or only slightly curved surface, showing good and careful chipping. The other side is only partially dressed, and shows a large hump with a portion of the outside crust still remaining (see two views of this object, figs. 9 and 9a). The stone was originally a waterworn boulder, as one can see from the remaining piece of crust, and would have made an axe of medium

size ; but whether the workman laid it down till a more convenient season, and was prevented by some cause from returning to finish it, or that it was rejected because it was not working true, I am unable to say. Mr. Coffey informs me that he and Mr. Ward found a smaller object of a similar kind.



Scale - $\frac{1}{2}$ linear

FIG. 9.



Scale - $\frac{1}{2}$ linear

FIG. 9a.



Scale - $\frac{1}{2}$ linear.

FIG. 9b.

Much light has been thrown on the manufacture of stone implements by Mr. William H. Holmes's Monograph, in the Annual Report of the Bureau of Ethnology, Washington, published in 1897. I am struck with the likeness of this Dundrum specimen to some of the "Turtlebacks" described by him, though in this case the under-surface is well worked. We would require more examples before we could judge whether it was likely that the workman would have been unable to reduce the humped side to a curve similar to that of the well-worked side. The stone does not seem to be of very good quality, but if this was the cause of its rejection, one would have expected the workman to desist sooner, as a very considerable amount of labour has been expended on it. I hope further exploration may throw some light on this subject. In September, 1900, I visited these sites once more, and on the Ballykinler side found a rude chopper with a place for grasping with the hand dressed, the remainder was undressed (fig. 9b).

Rev. W. A. Adams found here three anvil stones of large size and irregular shape, also six others made from waterworn pebbles of medium size, all of which are very good examples. He found besides a tracked stone.

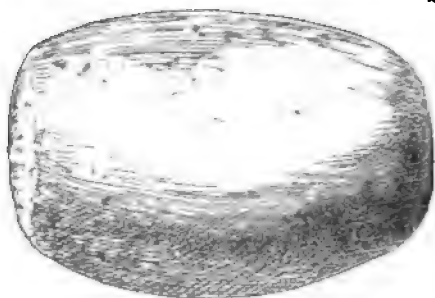
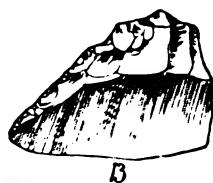
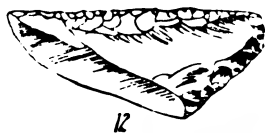
MAGHERA, COUNTY DONEGAL.

In August, 1898, Mr. and Mrs. Coffey stayed a week at Castlerock, that they might at their leisure look over the prehistoric sites at Portstewart and Grangemore. I went on two occasions to visit them, once alone, and again in company with Mr. W. H. Patterson, but we found almost nothing of interest. Mr. Coffey asked me to join him and Mrs. Coffey in examining a portion of the coast of Donegal. It was proposed to go to Ardara and come northwards. I had previously examined the south side of Donegal from Bundoran to beyond Killybegs, and I had also made several visits to Horn Head and Ballyness, and had been once at Skull Island and Bunbeg, but as I had not had the opportunity of examining the portion of coast extending from Maghera to Bunbeg I gladly accepted Mr. Coffey's invitation. Mr. Alexander D'Evelyn, M.D., of Ballymena, had visited Maghera in the neighbourhood of Ardara in the previous year, and had shown me several flint arrowheads and scrapers which he had found in the sandhills there. Consequently we had expectations that we would not be disappointed in our visit to this place. We arrived in Ardara on the evening of the 13th August, and made this our headquarters for several days. On the 14th we drove to Maghera, about four miles distant, and found a considerable extent of sandhills which had suffered greatly from denudation, the old surface being exposed in many places, and some parts entirely broken up and the contents scattered about. Dr. D'Evelyn, during his stay in this place in 1896, had been very kind to the fishermen and their families, and by judicious treatment of their ailments had made them all fast friends. They consequently collected the flint implements as they became exposed in the sandhills and sent them to him by post. He has now a nice collection of flint objects from Maghera, with some of black chert, besides hammerstones. The place being thus so thoroughly and regularly searched there was little for us to collect, still we got three or four nicely worked flints each, besides some flakes of quartz and quartzite. We found lying around several of the hearth sites split pebbles, of metamorphic rock, which must have been used as cutting implements, as the supply of flint was very limited, being apparently only obtainable from the occasional

pebbles found on the seashore. We got several hammer-stones, and brought away three or four well-marked specimens. We found, as in the Antrim and Derry sites, the usual broken and split bones, also the teeth of ox, boar, sheep or goat, and red deer, besides shells of cockle, limpet, periwinkle, with occasional examples of mussel. Sometimes small heaps of one kind of shell, most generally periwinkle, limpet, and cockle were found, though more frequently all kinds were mixed together.

NARIN, COUNTY DONEGAL.

Narin is about five miles north of Ardara, and we selected this place for inspection on the second day. The sand-hills occupy a sheltered position, and the denudation had not been of so destructive a kind as to obliterate all traces of the prehistoric surface. We found in hollows, that had been scooped out by the wind, a considerable quantity of flint. The flakes were mostly of a regular knife-like kind, thin, with sharp edges, suitable for knives even without any dressing, but many were nicely dressed into knives with handles, and such implements occurred in greater abundance than any other kind. We obtained eighteen or twenty of these, some of them being very perfect. They were well made and sharp, and many had never been used. We also got some well made scrapers and a few small cores, hammer-stones, and an anvil stone, besides flakes and split pebbles of other hard rocks. Bones and teeth of ox, pig, sheep or goat, and shells of oyster, cockle, limpet, and periwinkle were found, with occasional examples of the razor shell. At the end of the sand-hills adjoining the village of Narin we observed graves lined along the sides and covered on the top with thin slabs of stone, but we did not consider that these graves were in any way connected with the people who made the flint implements. The corpses had been buried in an extended position with the head to the west. The skull in one instance was exposed, but so shattered that it could not have been restored. Graves of a similar kind have been found at Skull Island, on the coast near Glenarm, on Island Magee, county Antrim, and elsewhere. The graves at Narin are noticed in vol. vi., 5th ser., page 382, of the *Journal of the Royal Soc. of Antiquaries, Ireland.* Dr. D'Evelyn examined these sites a short time after our visit and found a flint knife and several other objects. Mr. and Mrs. Coffey, at Easter, 1899, made a second inspection of the sites at Narin, and dug over some of the old pre-historic surface. They got more knives and scrapers, besides a



M. Knowles
1899-



No. III. - Flint knives, hammer-stone, and scrapers, Narin, County Donegal.

flint axe nicely polished. The axe was of the short or swage kind, which was probably used mounted in a withe handle. A series of objects from Narin are shown on No. III. opposite. Figs. 10 to 13 are knives; 14, a hammerstone; 15 and 16, scrapers; and 17, 17a a knife-like object of flint.

LOUGHROS MORE, COUNTY DONEGAL.

On the third day we visited a very extensive stretch of sand hills at the head of Loughros More bay. This place lies between Narin and Ardara and faces the open sea. It is, therefore, greatly exposed to the full force of the wind, and the sand in consequence is constantly shifting and being piled up in high ridges. Under these conditions prehistoric remains would not have had a good chance of preservation even if they had been left for us to find, but we considered that owing to its exposed position it may not have been used as a place to reside in, but only as an occasional resting place. We did not find split pebbles or sharp pieces of rock, but we saw numerous large edible shells, some in heaps, composed of one species only, and in other cases mixed. There was abundance of oyster; mussels of very large size, and collections of cockle, limpet, and periwinkle were also plentiful. In several places we found a schistose rock, which may have supplied sharp-edged pieces for cutting, but the rock was greatly weathered, and in all cases in a crumbling condition, and there were no marks that could give indication whether any of the pieces had ever been used as tools. Mr. Coffey towards the end of the day found one small fragment of flint, but it could not be called a worked piece. We saw in the bottom of a large pit a quern with the top portion split across. It was not connected with any other remains, and we do not consider that it had belonged to the people of the Stone Age. We saw the teeth of cow, pig, sheep or goat, but so disconnected with stone and other remains that we cannot speak with any certainty about them. Rev. W. A. Adams found a hammerstone and anvil-stone at this place, also a stone cist, near which he found a patch of a bronze cauldron with nail holes round the margin. He also found a piece of quadrangular rock, about 5½ inches long, with a deep groove on one side. Dr. D'Evelyn found a very good hammerstone at this place, but broken.

RUTLAND ISLAND, COUNTY DONEGAL.

We came northwards to Dungloe, and from this point we visited Rutland Island and Maghery. In Rutland Island there were several pits among the sandhills which had been excavated by the wind. In

one of these there were scraps of old surface which yielded teeth and bones of ox, shells of oyster, cockle and periwinkle, and also split pebbles of quartzite, but we did not find any hammerstones. We considered, however, that we had evidence of the island having been occupied in prehistoric times. We were informed that the island at present contains seventy inhabitants. Mr. James Boyle, one of the islanders, told us that several years ago, after a great storm, when much sand was blown away, a number of gold and bronze pins were found. He said the Doctor of the island and a schoolmaster got some of them, and others were sold to "museum hunters." There is a plentiful supply of good spring water in this small island. We were informed that bronze pins had also been found in a neighbouring small island called Inishfree. Rev. W. A. Adams found in this island two hammerstones, a piece of pottery, and some bones.

MAGHERY, COUNTY DONEGAL.

We also examined the sandhills at Maghery, called by the people of the locality "Maharry." We found eight or ten well marked sites in this place, one of which was still bounded by a circle of stones loosely and irregularly put together, and measured eighteen feet in diameter. Shells were abundant in all the sites and consisted of limpet, mussel, periwinkle, and oyster. We also found a few specimens of dog-whelk, some whole and some broken. We found numerous examples of split pebbles and spalls, or flakes of hard crystalline rock, a few well marked hammerstones, and several pieces of flint, some of which showed secondary chipping at the edges. We also found a broken bronze pin—the point end. In this place the black layer had undergone much denudation, and our finds were all from the present surface. Rev. W. A. Adams found a hammerstone, also a piece of bronze at this place, and Mrs. Hunt found a comb nicely decorated with concentric circles. Dr. D'Evelyn also found two broken bronze pins here.

BUNBEG, COUNTY DONEGAL.

We made another shift and came north to Bunbeg. I had previously inspected and reported on the remains from the sandhills at this place. We again examined the sites and found hammerstones, choppers, one of which is figured in No. VII., fig. 33, and the usual split pebbles. Although I did not find flint in this place on my first examination, yet Mrs. Coffey, on the second day of our visit, found several pieces.

Nothing further was found on the mainland to throw fresh light on the early occupation of this place, and we therefore decided to inspect a number of small islands lying off the coast.

INISHINNEY, COUNTY DONEGAL.

We found very good indications of the occupation of this island by prehistoric man. One flint flake, dressed on the edge as a knife, or scraper, was found by Mr. Coffey, besides split pebbles and spalls of crystalline rocks which had been used as implements. Where the old surface was bared we found shells of oyster, mussel, limpet, periwinkle, and cockle. We also found a large antler of red deer well embedded in the old surface.

GOLA, COUNTY DONEGAL.

We also visited this island, but found nothing which we could with certainty describe as artificial, though we saw split bones and shells which we considered were indications that the prehistoric people had occupied this island also.

CARRICKFIN, COUNTY DONEGAL.

The boatmen next put us on to a place which they called "The Point." This we believed to be another island, but it turned out to be a peninsula connected with the mainland. We found several well marked sites in this place, and the first we visited was Carrickfin. We saw abundance of split bones of ox and sheep or goat, besides shells of oyster, limpet, and periwinkle, also unbroken specimens of the dog-whelk. Patches of black layer, or prehistoric surface, were also observed in various places.

CARNVEAGH, COUNTY DONEGAL.

Several pits were found at this place, which is about twenty minutes walk from that previously described. In one pit we found limpet, periwinkle, and cockle; in another there was a space of about 16 yards by 13, closely spread with specimens of broken dog-whelk, but only lying on the surface, and in spots here and there shells of limpet, periwinkle, and mussel were mixed with them. Teeth and bones of ox, sheep, or goat, and red deer were also occasionally found lying among the shells. We also found several pieces of flint, some in the form of

flakes, and some as whole pebbles. The usual split pebbles of other hard rock were also found at this place. In another pit we found not only dog-whelk broken up as we had found it at other places, but also some broken cockles, with whole cockles, periwinkles, and limpets all mixed up together.

MOLFIN, COUNTY DONEGAL.

This was the name given by the fishermen to a place about half-an-hour's walk from Carnveagh. Here we found a large pit in the centre of which was a mound about 70 paces in length, and nearly as much in breadth. At the top it showed a small piece of the old surface or black layer, and from this the mound sloped down to the bottom of the sand-pit, giving the mass the appearance of a cone. The sloping sides were strewn with broken and split pebbles and shells of oyster, mussel, limpet and cockle, also with teeth and split bones of cow and sheep, or goat. We got one fine hammerstone.

Having found the dog-whelk, which is not considered an edible shell, in so many places, and so mixed up with other shells as if they had all been used in the same way, we asked the fishermen who rowed us from place to place, if they knew or had ever heard of anyone using the dog-whelk for any purpose, and they said they never knew or heard of the inhabitants using it for food, bait, or any other purpose whatever, but about twenty years ago a French vessel was dismasted and was obliged to put into Inishman, another neighbouring island, and the sailors of this vessel selected the dog whelk by preference for eating. "They would not," they said "eat any other kind." Knowing of the broken condition in which the dog-whelk is usually found in the sand-hills, we asked the men if they knew whether the French sailors broke the shells in order to extract the animals, but as to this they could not inform us.

BALLYNESS, COUNTY DONEGAL.

On continuing our journey northwards we visited Ballyness Bay. I have already reported on this site, but Mr. Coffey had not previously seen it. Nothing requiring special mention was found on the first day, but two days later Mr. and Mrs. Coffey, Miss Edith Oldham, and Miss Edwards returned to Ballyness Bay from Dunfanaghy. I was not able to accompany them, but Miss Oldham in a letter informing me of the results of their day's exploration says:—"We spent yesterday on the sandhills at Ballyness. We did not find anything till quite

late, and then Mr. Coffey discovered some tiny flakes of flint. We all groped about, and then Mr. Coffey found a very good tracked stone. I also found a beautifully worked small flint 'slug,' and later on a tiny scraper. Mrs. Coffey found some worked pieces of flint too, and we collected altogether perhaps fifty pieces of flint, cores, flakes, and little fragments."

They examined all the sandhills from Dunfanaghy to Ballyness, and found a few more pieces of flint, and some pottery. The tracked stone found by Mr. Coffey may probably be of the same age as the bronze pins found at one time in such abundance at Ballyness Bay, as objects of that kind are believed by our best authorities to belong to the Iron Age. Dr. D'Evelyn of Ballymena, who followed our party about a week later, found a well made arrowhead of flint at Ballyness.

HORN HEAD, COUNTY DONEGAL.

We also visited the sites on the sandhills of Horn Head which I have previously mentioned in other reports. In one place we found about two square yards of surface with limpet, cockle, periwinkle and dog-whelk, all mixed and thinly scattered over this space. The dog whelk was not broken as in some other stations, and was rather more numerous than any of the other species. The hut sites at Horn Head are mostly bounded by stones, very irregularly placed, but giving them a somewhat circular appearance. I paced two of these and found the diameters to be five and eight paces respectively. We found and brought away a good number of well marked hammerstones. Dr. D'Evelyn followed us here also, and on an elevated part of the sandhills within view of Dunfanaghy found a "tracked stone." There are two sets of sandhills in Horn Head, one beginning at the bridge crossing over from the mainland to Horn Head, and extending up to the high ground I have mentioned. The other, where the hut sites are found, is over the hill, and about a mile from Dunfanaghy. They begin at the side of a small stream, and extend up the hill side. Mr. Travers King found in the sandhills nearest Dunfanaghy, in the summer of 1900, three bronze pins like those formerly found at Ballyness. One of these pins has the red enamel setting still in good preservation.

OMEY ISLAND, COUNTY GALWAY.

In the summer of 1899, in company with my wife, I visited Omev Island, which we examined as well as time would permit. It is a

half-tide island, and we required to enter while the tide was out, and leave before it returned. We found towards the north side of the island a small freshwater lake which was almost surrounded by hut sites. Owing to the sand which had originally covered the sites and surface generally having been greatly blown away, many well-marked hut sites were visible. In one of these was a heap of shells composed of limpet, cockle, and razor shell. The layer was fully a foot in thickness, and there were abundant signs of fire. There was a profusion of similar slightly elevated places, and from the black colour and charred remains these were no doubt the centres of hut sites. These places were largely composed of edible shells variously mixed. On the face of the hill between the fresh water lake and the sea the sites of huts were particularly numerous. Many rounded quartz and quartzite pebbles were found split mostly into halves. If the pebbles were thin and circular they were split lengthwise, not across, so as to give two thin portions which would be useful for scrapers or knives without any dressing at all, and there is every reason to believe that the pebbles were split for purposes of this kind, as we saw no flint. Several well-marked hammerstones were found and brought away. The usual teeth and bones of mammals, such as cow, deer, &c., were found, but time did not permit our completing the examination of the island, nor were we able to see, as we hoped to do, a large shell mound which had been cut through by Mr. G. H. Kinahan, M.R.I.A., as described in *Geological Magazine* for 1868.

CUSHYTHROUGH, COUNTY GALWAY.

This place was also examined by my wife and myself. It is on the mainland nearly opposite Omey Island, and there are many well-marked sites which have been laid bare by the sandy covering having been blown away. These sites are visible from Omey Island, and a native of the island called them Fountain Hill. They were, however, described to us as Cushythrough, or Cushythraugh by the people on the mainland. We examined several hut sites and found the usual edible shells, sometimes one kind, and sometimes another being in greater abundance. We found dog whelk on one or two sites in the broken condition. In some of the sites hammerstones and split pebbles were scarce, while in other sites a few paces off they were plentiful, and many good examples of sharp edged pieces suitable for knives were found. We found no traces of flint or pottery. A piece of rock from these sites with sloping edge, which may have been used as a rude axe or chopper, is shown in No. VII., fig. 32.

MANNIN BAY, COUNTY GALWAY.

We visited this place while staying at Clifden in August, 1899. I had given it a hasty examination at Easter, 1896, but was anxious to see it again. We found numerous and well-marked sites, but as the rock of this district is very coarse and weathers, I should think, quickly, we did not find many things that could be looked on as implements of a characteristic kind. Split pebbles which had probably been used as knives and scrapers were plentiful, and we got a few hammerstones. We did not find any flint or pottery. There was one large sloping space which I found to be 48 paces in length, and 36 in breadth, which was strewn pretty thickly with shells. At the one end the shells were almost all broken dog whelk. These thinned out towards the centre, where they became mixed with the ordinary edible shells, and the remainder of the space contained only shells of the edible kind. I have not as yet obtained any specimens of the broken dog whelk directly from the old surface, but from the number of sites in which it has been found, and in many cases mixed with the edible species, I am inclined to think that the people who used the one kind must have used the other.

BUNOWEN, COUNTY GALWAY.

We returned from the sand-hills on the south side of Mannin Bay by the way we entered them, and drove to the village of Ballyconeeely, and then to sandhills opposite Slynehead Lighthouse. This site is known as Bunowen, and is the place visited by the exploring party of the Royal Irish Academy at Easter, 1896. On that occasion I only arrived on the spot at dusk when the others were ready to leave. On our present visit we saw many well-marked sites with abundance of shells of the edible kind lying scattered about, chiefly limpet, periwinkle, and cockle. We found hammerstones and chopper-like implements with dressed circular edges, like those found by me at Roundstone, and figured in the Report of the Committee, consisting of Messrs. Patterson, Praeger, Bigger, and myself, which is published in the Academy's *Proceedings*, 3rd Ser., vol. v., p. 433. We did not find any flint or pottery.

DOGS BAY, ROUNDSTONE, COUNTY GALWAY.

I did not again visit Dogs Bay in 1899, as I had given it a very searching examination in 1896. I then obtained several very interest-

ing objects, some being large, rude flakes of granite, and others igneous and metamorphic rocks, with well-marked bulbs of percussion. Others were undoubtedly dressed into cutting or scraping implements. I also got hammerstones, some being smoothed by rubbing, after having in the first instance served for hammering. Several examples of the objects found by me are figured in the report of the Committee mentioned above.

In a paper by Mr. F. J. Bigger, M.R.I.A., and also in the report referred to, mention is made of a heap of broken shells of the dog-whelk. The space covered by these was measured by me and found to be 15 paces at one end and 3 at the other, by 55 paces in length. Other shells of edible kinds were found in separate heaps, or slightly mixed in some places. Dog-whelk, as it will be seen, has been found in a number of sites, and it is not yet decidedly known what use they had been put to.

COUNTY CLARE.

In September, 1898, Mr. R. D. O'Brien, of Limerick, sent for my inspection a core of dark-coloured stone, some flakes of similar material, and shells and broken bones from a kitchen midden in county Clare. These were so interesting that I advised a further examination of the place, and in July, 1899, a party consisting of Mr. O'Brien, Mr. George Fogerty, B.N., Mr. William Fogerty, M.D., and Mrs. Fitt, members of the Limerick Field Club, the Misses Marshall, of Ambleside, Mr. E. T. England and Miss Helen England, of Manchester, and my three daughters met at Lisdoonvarna and spent a week examining the coast of Clare. The following information is taken from my daughter's report :—

SPANISH POINT.

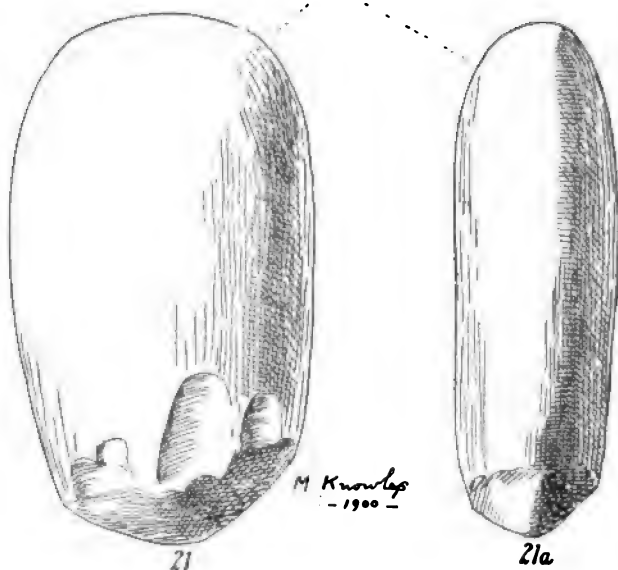
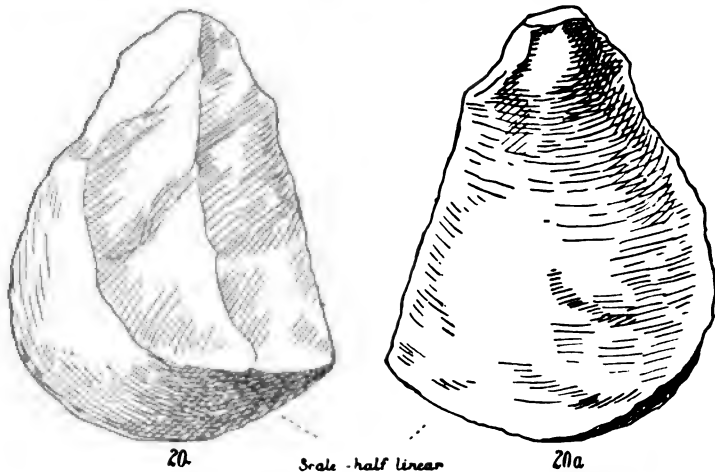
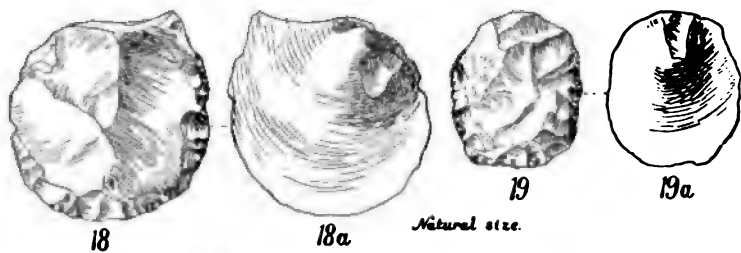
The first place visited was Spanish Point, where remains of a rather extensive settlement were found in a stretch of sand hills close to the Atlantic Hotel. About ten hearths were found, and round about them numerous rough cores and flakes of blackish rock, which Professor Cole has kindly examined and determined to be a fine-grained, muddy sandstone, probably of Silurian age. Shells of limpet and periwinkle were also lying about in heaps, and close to one of the hearths my eldest daughter found a large anvil stone and a hammerstone, also a large chopper, showing marks of use on its edge. Several flakes were brought away, and also some teeth and bones. These latter were found to be cow, pig, and red deer. No flint or pottery was found.

CARROWMORE POINT.

Carrowmore, which lies about ten miles south of Spanish Point, was the next place examined. This was the place from which Mr. O'Brien had sent the specimens in 1898. Some of the old surface which was exposed was dug over, and flakes, spalls of broken rock, hammerstones, bones and shells were obtained in abundance. Some of the hammerstones were very large. My daughter brought away two, which were not the largest, and they weigh $6\frac{1}{2}$ lb. and $1\frac{1}{2}$ lb. respectively. The smaller one of these is figured half size on No. IV., fig. 21. The flakes and broken pieces of rock were of the same fine-grained, muddy sandstone as those from Spanish Point. One of the flakes is figured in No. IV., fig. 20. It will be seen that several flakes had previously been dislodged from the back of this flake, and that it has a good bulb of percussion. The sharp edges of such rude flakes usually show hacks and marks of use. Among the bones found at this place were those of red deer, pig, horse and cow, also some fish bones, which were found to be skate. All the bones were determined by Professor Newton, of Magdalene College, Cambridge. Some very fine clay, which would have been suitable for making pottery, was dug from the black layer, but no pottery or flint was found. Similar lumps of clay have been dug from the old surface at Whitepark Bay, and from the sites on Keel Strand, Achill Island, and it is supposed that the clay may have been carried to the sites in these places and pottery made there, though at these sites and those in Achill none has yet been found.

FANORE.

At Fanore, near Black Head, some sites were discovered in a small stretch of sandhills. Two very nice flint scrapers were found on the surface, and are shown, natural size, in figs. 18 and 19, No. IV., next page, but more than a dozen small flakes of the same material were dug out of the black layer. The party also obtained several flakes and core-like pieces of Carboniferous chert. Some of these flakes show dressing, and must have been used for scraping. Hammerstones were also dug out, and Dr. George Fogerty found about the quarter of a very nice anvil stone, which had been broken through the centre (see No. V., fig. 24, p. 357). Several pieces of pottery similar to that found so abundantly in the sites in Antrim, Down and elsewhere, were dug from the black layer, and also several lumps of clay like that found at

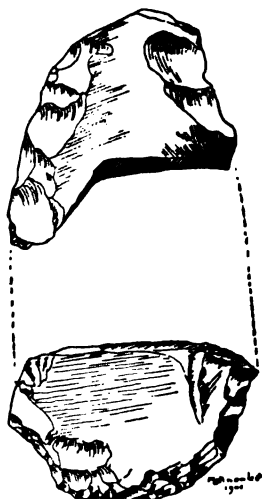


No. IV.—Flint scrapers, hammerstone, &c., County Clare.

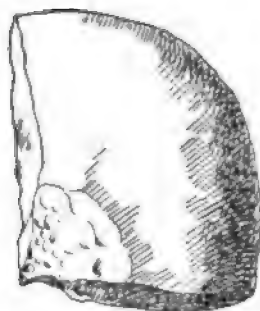
Carrowmore Point. Bones and teeth of red deer, cow and pig, also shells of limpet, mussel and periwinkle were dug out of the old surface. In one pit a flake of a polished stone axe was found; in another a small heap of broken dog-whelk, and also several heaps of periwinkle and limpets unbroken.

FISHERSTREET.

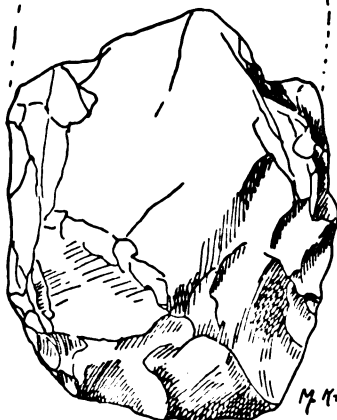
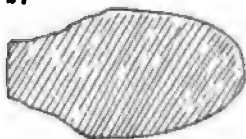
A hasty examination was made of Fisherstreet in 1899. Good indications of a prehistoric settlement were found in teeth and bones of animals, the usual shells, and some rude flakes of stone. In July, 1900, when the Royal Society of Antiquaries met at Lisdoonvarna several Clare sites were re-examined, and among the rest Fisherstreet. Dr. D'Evelyn, of Ballymena, discovered at the foot of a cliff, a place which had evidently been the site of a manufactory of stone celts. One perfect example rudely made, many broken specimens with flakes, which had evidently been struck off in the course of manufacture, were found by him, while other broken specimens, flakes, and a very good hammerstone were found by my daughter. Two portions of what may have been the same implement, which had got broken in course of manufacture, were found by my daughter. A large piece is wanting in the centre, and I show the two end pieces in the relation in which I think they should stand to each other in fig. 22. The half of a celt found by my daughter, showing cutting edge, is figured, both faces being shown (see No. V., figs. 25 and 25*a*, next page), and the butt end of a similar specimen found by Dr. D'Evelyn is shown in same plate (fig. 23). He also found the butt end of another celt, which is partly ground. The unbroken specimen which was found by Dr. D'Evelyn is shown in No. VI., p. 357, fig. 26, with section fig. 26*a*. Some of the flakes of manufacture are shown (see No. VI., figs. 27 to 30). Mr. R. D. O'Brien went back to this place in September, 1900, in company with Lord Dunally, and they found two more perfect celts, though rudely worked. These are now in Lord Dunally's collection.



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Scale - 1/2 inch
FIG. 22.



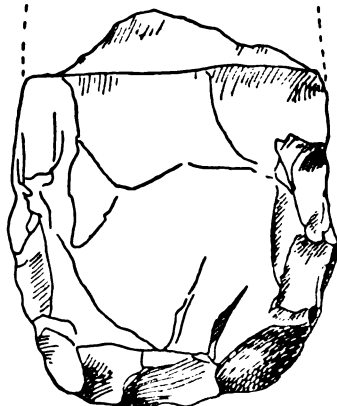
24



25

M. Knowles
1901

Scale - half Urean

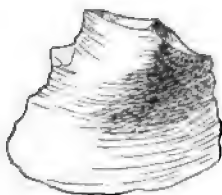


25a

No. V.—Broken-stone celts and anvil stones, Fisherstreet, County Clare.



27



28



26



29



30



26a

M. Knowles
1901

Scale—half linear

No. VI.—Rough-stone celt with section, and 4 stone flakes, Fisherstreet, Co. Clare.

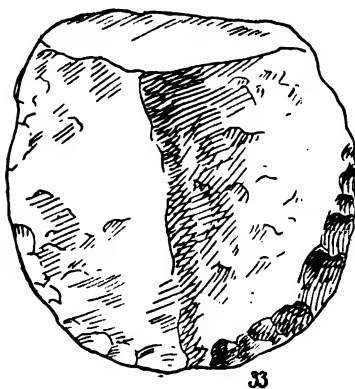
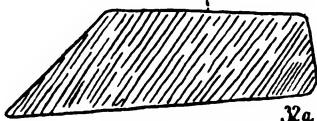
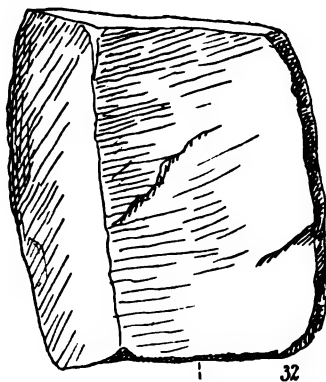
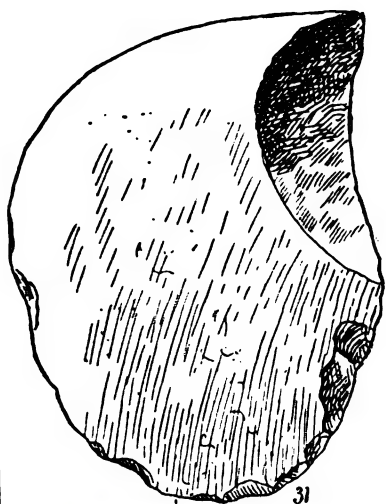
BALLYBUNION, COUNTY KERRY.

I have given the foregoing account of the work done in county Clare, as it carries the record southwards in regular succession without going backwards and forwards from place to place. I now resume the account of the exploration done by my wife and myself.

My attention was drawn to Ballybunion by an account given in the *Journal of the Royal Society of Antiquaries, Ireland*, for 1893, vol. III., p. 78. We visited the sandhills there in August, 1899, and found several well marked sites with old surface. On digging over portions of the old surface we obtained broken bones and teeth of deer and ox; also abundance of shells, chiefly of limpet and periwinkle. On the surface we found many split pebbles, and one large and thin knife-like flake of quartzite with marks of use on the edge. It is shown half-size with section in fig. 34, No. VII. We got eight well marked hammer-stones, five of which owing to our being already too heavily laden, we were obliged reluctantly to leave behind us. We found no flint or pottery.

TRALEE AND BRANDON BAY, COUNTY KERRY.

My wife and I also examined the sandhills separating these two bays. After a good deal of fruitless search we found a place near the base of the small peninsula where the sand was greatly blown away, exposing a long valley extending from the one bay to the other, in which we found a considerable number of hut-sites. One small mound, possibly the centre of a hut, was about three yards in diameter, and was plentifully strewn with shells of cockle, periwinkle, oyster, and limpet, and close beside this mound there was another of about the same size. On this site I got numerous stones evidently intentionally broken and split to obtain sharp-edged pieces for knives and scraping tools. A third mound had oyster, limpet, and cockle strewn on the surface, and I found on it a large bone which belonged to a cetaceous animal, and had apparently a sharp edge ground on it. Four other mounds undoubtedly the centres of huts, were examined from which we obtained hammer-stones, one of which was of white quartz rock. I also show a small boulder from which two or three bold flakes have been removed, making the remainder into a good cutting implement, with a heavy butt for holding in the hand, and a fine cutting edge at the opposite end which shows marks of use. Two views of this implement are shown on No. VII., fig. 31.



M. Knowles - 1900

Scale: - half linear

No. VII.—Rude-stone choppers and knives, County Kerry.

The bones and teeth found at this place were submitted to Professor Newton, of Magdalene College, Cambridge, and he found them to be bear (one tooth), red deer, two cetaceous bones, one of which had been sharpened for cutting or scraping, also the teeth of a small species of horse.

The Rev. W. A. Adams, of Antrim, has shown me several finds which he made in various sites in counties Donegal, Antrim, and Down, which he intends publishing an account of at an early date. The following is a list of the articles found :—

Rosapenna, county Donegal.—Five hammerstones and small polished Celt, rechipped at butt, also three circular discs of the kind found at Horn Head and Ballyness (see *Proceedings*, 3 series, vol. III., No. 4, figs. 6 and 7).

Lettermacward, county Donegal.—A flint scraper, a flake of crystalline rock dressed like a scraper, half of hammer and anvil stone combined, frontal bone of a human skull, and further along on same range of sandhills several pieces of pottery and fragments of iron.

Inishfree, county Donegal.—A bronze needle, a paddle supposed of whalebone, several pieces of pottery, and the lower half of a quern. He got from a person living on the island a whetstone of black colour, with small hole in one end.

Castlegoland, county Donegal.—A piece of pottery and upper half of a mill stone.

His other finds at Rutland Island, Maghery, and Loughros More, county Donegal, and Dundrum, county Down, are enumerated at the end of my reports on those sites. Those at Whitepark Bay are of a very interesting kind, and I refer to them under the heading of “Finds of Bronze and Iron Ages.”

SMALL BORERS, KNIVES, AND SCRAPERS.

I have already described the find of small borers from Grangemore, but as minute implements of flint are receiving a good deal of attention from Antiquaries at present I shall deal with the subject more fully. Besides the borers from Grangemore I have in my collection a number of very small implements from various parts of the North of Ireland, some of which are borers, some scrapers, and others may have been used as knives. Similar small tools have been found in other countries, for example, in England, France, Egypt, and India. Some years ago Rev. Canon Greenwell, F.R.S., sent me a few very small borerlike objects of flint to see if anything like them was found in Ireland, and again about

a year ago he wrote making a similar inquiry. Through his means I was introduced to the Rev. Reginald A. Gatty, with whom I have had a good deal of interesting correspondence on the subject of small flint implements. Mr. Gatty has found thousands of small flint tools in South Yorkshire and Lincolnshire, and has contributed a most instructive paper on the subject of "Pigmy Flint Implements," to the "Reliquary and Illustrated Archæologist" for January, 1900.¹ He gives a history of the discovery of these minute objects, and illustrates his paper very fully by figures carefully drawn by Mr. Worthington Smith.

Mr. Gatty says his attention was first attracted to these small tools by a paper written by Dr. Colley March, of Rochdale, on the early Neolithic floor of East Lancashire. In this paper, he says, "Dr. Colley March describes the discovery of numerous small crescents of flint, the secondary flaking on which was so fine as to need a magnifying glass. He designates them as borers and gravers, having a fine point for boring holes perhaps in needles, and some with a broader end for graving purposes. Associated with them were hammers, scrapers, flakers, knives, spear-heads, and arrow-tips, rudely made and entirely destitute of polish." He also mentions Mr. Abbott as having found crescent knives and other pigmy tools with them in the Kitchen Middens on the Hastings coast, and that Dr. Allen Sturge had procured some very small implements at Mildenhall, in Cambridgeshire, but the latter are not quite so small in size as some of the others mentioned. He quotes from a pamphlet by M. de Pierpoint, giving descriptions and figures of small sized implements having the shape of crescent, triangle, trapeze, &c., from the Neolithic open air station in the province of Namur, in Belgium, but M. de Pierpont has not found any of the larger Neolithic implements associated with them. He further gives a description of the finds of Mr. A. C. Carlyle in the rock shelters and caves of the Vindhya hills in India. The implements found here are small, and of crescent, triangular, scaline, and rhomboidal forms, and he says it would be difficult to distinguish the British from the Indian specimens. This I can confirm as regards the specimens which Mr. Gatty has submitted to me.

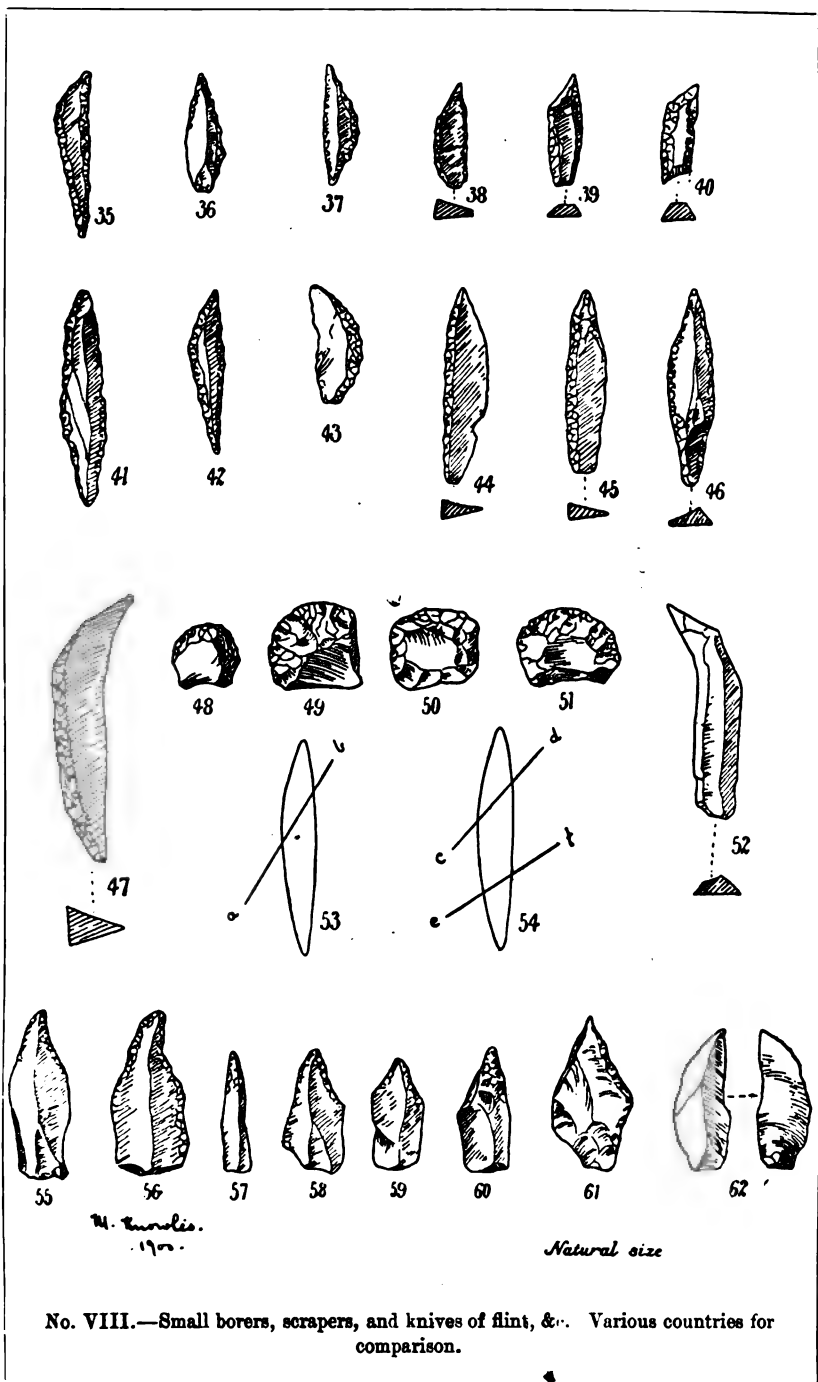
M. de Morgan, in "*Recherches sur les Origines de l'Egypte*," 1896, pp. 129-131, and also in the volume for 1897 on the same subject, pp. 84, 85, figures and describes a few small crescent shaped flint objects from Héliouan, in Egypt, like some of those referred to, though slightly

¹ Mr. Gatty has contributed a second paper on the same subject to Soc. Antiq. Scot. not yet published.

larger, being about $1\frac{1}{2}$ inches in length. In order to show how such crescent shaped flints may have been used as arrows he figures one tied with its dressed and convex side to a shaft, so that one of the points forms the point of the arrow and the other projects from the side as a barb. I show in fig. 47, No. VIII., a small implement from H  louan similar in kind and size to those figured by M. de Morgan which, while it would make a very good knife, would, owing to the rather thick butt and also curved point, make an indifferent arrowpoint and barb. I also show in fig. 52 a figure of a flake of nearly the same shape, but without dressing, from Morahna Pah  r, India. M. Gabriel de Mortillet figures a number of small implements in *Formation de la Nation Fran  aise*, p. 250. They were found in the neighbourhood of Fere-en-Tardenois (Aisne), and are of Neolithic age. He figures nine examples, of which four correspond very closely to figs. 35, 42, and 44 in No. VIII. The remainder are in the form of triangles, except that two of them have concave bases. He figures on page 251 a small implement similar to fig. 44 on No. VIII., only quite perfect at both ends. This is of Magdalenian age. In *l'Anthropologie* for Novembre-D  cembre 1899, p. 671, there is a paper by M. Henri Quilgars on *L'industrie des Silex    contours Geometriques* from the neighbourhood of Guerande (Loire Inferieure). These are not quite so regular in form as those figured by me from Mr. Gatty's collection, and some of the specimens show a concavity on the sides apparently worked. The author is inclined to consider some of them of Gallo-Roman age.

By permission of Mr. Gatty, I show figures of six specimens from his collection, three English, see figs. 35, 36, 37, No. VIII., and three Indian, for comparison see figs. 41, 42 and 43, No. VIII. The four examples shown in figs. 38, 39, 40, 44, are of specimens which he presented to me, and figs. 45 and 46 are Irish examples from my own collection. It will be seen by the figures how great a resemblance the Indian specimens have to the English, fig. 35 of the one and 42 of the other being particularly alike. The English example shown in fig. 44 is also very similar to fig. 45 found in Ireland—the straight, almost perpendicular dressing across the back, and the sharp cutting edge on the opposite side being almost identical, as will be seen by the sections given below the figures. Implements like these with sharp edge on one side I should say were minute knives, and those having both sides dressed, like figs. 35, 36, 37, etc., were probably borers, but either of these kinds may also have been used in scraping.

I show on No. VIII., figs. 48, 49, 50, 51, four small scrapers from Bundoran, county Donegal. One of these, fig. 51, is of flint, the other



No. VIII.—Small borers, scrapers, and knives of flint, &c. Various countries for comparison.

three are of black carboniferous chert. These and other small scrapers from various sites were found associated with larger flint implements. It will be observed that some other explorers have had similar experience in finding large and small implements together. I believe that the small tools of all kinds which I have described must have been implements of the Neolithic people, but until a comparatively late period they were neglected and overlooked. They extend back to the later stages of the Palæolithic Age, and it is possible they may have continued later than Neolithic times. I show at No. VIII., fig. 62, two views of a small flake from Portstewart, one of many small flakes found there, and at Grangemore, which I should say were purposely produced for making into small borers.

I have an idea that some of the geometrical forms may have been produced by the endeavour to restore a point to a long fine implement when broken. Suppose a longish knife or borer of the outline shown in fig. 53 or 54, got broken at the point, the easiest way to form a new point would be by dressing it in a sloped manner from one side to the other, say along the line *a b*. We would then have a figure similar to those shown in 35 and 42. If both points got broken it might be mended along the lines *c d* and *e f* of fig. 54. A little variation of these lines would give the different three and four sided figures sometimes seen among these small implements. The line of mending may take the form of a curve instead of a straight line, thus forming crescents.

I understand that some antiquaries hold the opinion that the small implements of various kinds have been produced and used by a race of dwarfs, and in a newspaper cutting, which was sent me a short time ago, a theory was suggested by another gentleman that they were used like coins as a medium of barter.

THE MANUFACTURE OF IMPLEMENTS.

The finding of chipped and broken stone axes at Fisherstreet, county Clare, and also of rude partially manufactured implements at Dundrum, county Down, suggests a comparison of the mode of manufacturing stone implements in Ireland with that followed in other countries.

The places mentioned above are not the only sites which have supplied instruction on this subject. There are several other places in Antrim, not referred to in this report, which have also yielded chipped axes, broken specimens, failures, and hammer-stones, all in association

with flakes struck off in the course of manufacture. Such places, together with the examples of flint and stone-working to be seen in the various sandhill sites, give a very fair insight into the methods of manufacturing implements during the Stone Age in Ireland.

In order to manufacture an axe, a boulder of flint, or hard rock appears to have been selected and worked by striking off flakes from either side till it assumed the shape of an axe, broad at the base or cutting edge and pointed at the butt. In the valley of the Bann and in county Clare rocks of fine hard quality appear in the form of thin flags, which are largely used in the manufacture of axes, as they only require to be split and hammered into shape and dressed along the edges, the central portions of the two principal faces generally remaining in their natural state. When an axe was fully chipped by the hammerstones it was ground, not backwards and forwards lengthwise as in other countries, but across, diagonally, and every way, so as to give it the necessary smoothing down. We find many axes merely ground and not polished on which the irregular nature of the grinding is easily seen. In some other countries fixed grindstones have been used and there the grinding may have been performed by a backward and forward movement in one groove, but this plan does not seem to have been followed in Ireland. The polishing after grinding seemed to have been effected by whetstones, of which I have figured examples. See *Journal R.H.A.A.I.*, 5th ser., vol. iii., figs. 49 and 50, p. 156.

Besides axes, some of our larger spear-heads must have been made from boulders or very large spalls, but many good sized spear heads, and all our smaller implements, scrapers, knives, arrow heads, borers, etc., have been made from flakes, in most cases produced for the purpose. We find such implements in all stages of manufacture, partly made, nearly finished, and also completed, yet in the majority of cases we can trace the original flake by the bulb of percussion or some undressed portion of the flake.

In other countries the plan employed in manufacturing implements, while appearing to have agreed in many ways with that found to have been in use in Ireland, yet varied considerably from it. Mr. William Henry Holmes gives a very full and instructive monograph in the *Fifteenth Annual Report of the Bureau of Ethnology*, Washington, published in 1897, "On the Stone Implements of the Potomac-Chesapeake Tide Water, Province of America." Good raw material for making the implements in question was found in the state of rounded boulders in gravelly deposits in and around the City of Washington; but, in order to obtain a sufficient supply of boulders of the best

quality, the people of the Stone Age in America were obliged to make excavations into these deposits. The boulders were chipped up into long thin blades on the spot; but such blades were not in reality finished articles, but merely brought to this stage that they might be more easily carried away than the boulders themselves to other sites where they could be manufactured into spear-heads and arrow-points. Among the refuse stuff left by the ancient Americans in the course of their excavations and manufacture, are boulders with one or two flakes removed, and rejected because found to be unsuitable, blades showing too great a hump on one side (turtlebacks), or otherwise not working true, and blades broken when nearing the finishing point, &c. From these partially-wrought and broken specimens, Mr. Holmes has given restorations, showing all the stages in the work, from the water-worn pebble or boulder up to the blade, and from that to the most finely barbed and tanged arrow-head. Flakes have been found in abundance, but no examples are figured. They are all the refuse of the manufacture of implements, and it does not seem that there has been a production of flakes, as in Ireland, for the sake of the flakes themselves; nor has it been observed whether any of the refuse flakes were used for cutting or scraping purposes.

The process of manufacture of these American implements has a likeness to that which has been followed in the production of our Irish stone celts; but there is this difference, that when the Stone Age folk of the Washington region got to a stage in the manufacture somewhat corresponding to our chipped celts they went further, and made such objects into spear and arrow-heads. This manufacture of arrow-points from leaf-blades, and each arrow-point being as a rule the product of one boulder, is a thing that is new to us, and different to the plan which has been followed in Ireland. I believe that the method employed by the Americans of the Washington region, as described by Mr. Holmes, cannot have been universal in North America; as Mr. Gerard Fouke, in his paper on "Stone Art," in the Thirteenth Report of the Bureau of Ethnology, pp. 173 and 174, shows that scrapers were made from flakes, and that arrow-heads made from flakes were frequently found. He figures an example of a spear-head formed by dressing a flake round the edges, and states that implements similarly formed were found in "Central Ohio, North-eastern Arkansas, Coosa Valley, Alabama, Eastern Tennessee, and Western North Carolina." I have a few American arrow-heads in my own collection, and there are some among them which were undoubtedly made from flakes; and I have a very good scraper, with

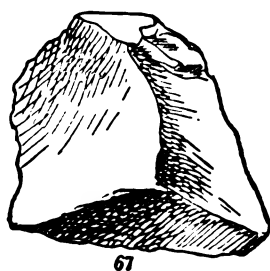
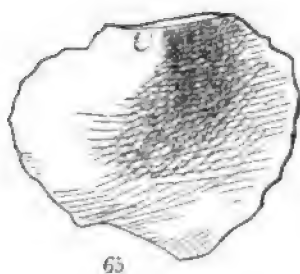
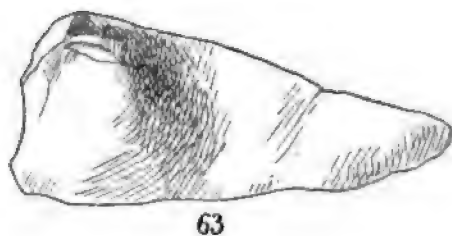
bulb of percussion and plain face on one side and dressed to a bevelled edge on the other.

There is another paper to which I wish to refer, as it also treats of the manufacture of implements. It is written by Mr. Henry Forbes, LL.D., Director of the Mayer Museum, Liverpool, and deals with a large collection of over 2000 flint implements found by Mr. H. W. Seton-Karr in Egypt, and acquired by that Museum. After supplying their own wants, the Museum authorities were able to sell or exchange several sets of implements, of which I obtained one in exchange for other objects. I have thus a selection of the implements themselves, in addition to Dr. Forbes' well-produced illustrations to aid me in studying them. The collection consists of axes of the Neolithic kind, roughly chipped into shape, also knives, bracelets, flakes, cores, &c. Many of the implements are formed out of a thin plate-like kind of flint, which, from their thinness, and the way in which they have broken in course of manufacture, show a great resemblance to the objects found at Fisherstreet, county Clare.

The Egyptian implements all seem to have been the products of manufactories, as many objects are only partially made, and others were broken while being shaped, as in the workshop-sites at Washington, and as has also happened at Fisherstreet. Some flakes and cores accompany each set of implements; but the flakes are all of the kind produced for the sake of the flake alone. There must have been flakes of manufacture lying about, but these do not seem to have been collected. Dr. Forbes assigns these Egyptian implements to the XIIth Dynasty, or about 4500 years ago. His reason for this conclusion seems to be the likeness of the implements of the Seton-Karr find to other flint instruments found at Kahun by Professor Flinders Petrie. There is, however, one kind of axe found at Kahun having a groove near the butt which I do not observe in some three of the sets above-mentioned that have come under my notice, nor is it figured in Dr. Forbes' Bulletin. But even though this type of implement was found in both collections, we must consider the long time that some kinds of implements survive unchanged, or very little changed in form, and feel convinced that a partial likeness among implements found at different places cannot be satisfactory evidence that they are of the same age.

FLAKES.

Flakes have been treated as of small account by collectors of antiquities. The fact of their being found in any particular place might be looked on as evidence of its occupation by man in the Stone



Scale:—half linear

No. IX.—Flakes of basalt and porphyry, struck off in the manufacture of stone celts.

Age, or considering that where flakes are lying about better things may be looked for, a little interest in searching for implements might be taken, but very few collected the flakes themselves. All the while when they are collected and studied they yield a considerable amount of instruction. Sir John Evans gives a very full account of flakes and their mode of production. He compares the flake produced for various purposes with those produced in the manufacture of celts or hatchets. In the former case the flakes are everything, and the resulting core or nucleus mere refuse. In the latter case it is just the reverse, the flakes are the refuse, and the resulting block is the main object sought for ("Stone Implements," 2nd ed., p. 31). He classifies flakes into—(1) external, or those which have been struck off from an outer surface of a nodule of flint; (2) ridged, or those presenting a triangular section; (3) flat where the external face is nearly parallel with the internal; and (4) polygonal where the external face consists of many facets.

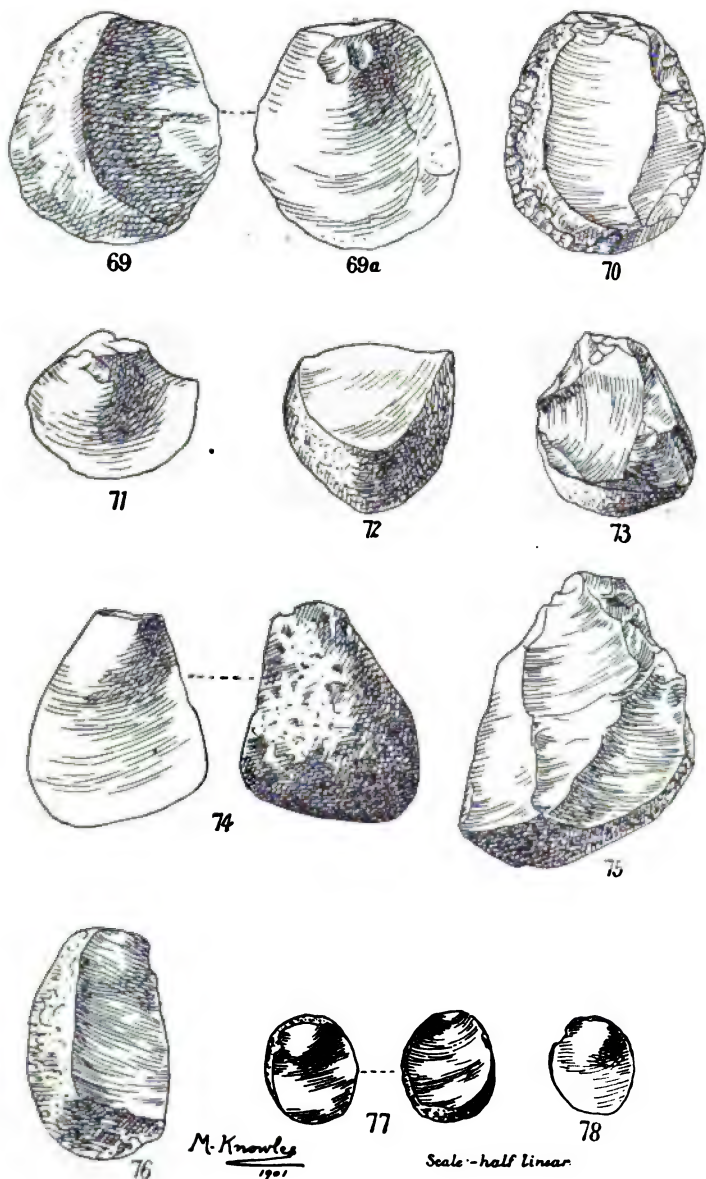
If we examine carefully a series of flakes that have been struck off in the manufacture of a stone celt we will not fail to observe the constant occurrence of particular forms. The majority will be found to be short, broad flakes with a wing, sometimes of considerable length, to one side, and occasionally to each side of the bulb of percussio. Such flakes might properly be classed as winged flakes. If you compare the flakes figured on No. VI., figs. 27, 28, 29, 30, from Fisher-street, which are waste flakes, produced in the manufacture of stone celts, and also those on No. IX. from other sites I have referred to, it will be seen how large a proportion of them resemble the *Mousterien racloirs* and *pointes* of French Antiquaries. I believe that the waste flakes produced in the manufacture of large implements by Palæolithic man in France and the south of England would be found too good to waste, and they were therefore used for cutting, scraping, etc. When dressed along the edges the original form of the flakes could not have been much altered, as might be judged from the close resemblance in outline of *racloirs* and *pointes* to the undressed flakes from county Clare referred to above, and some of the other flakes resulting from the manufacture of celts in No. IX. The custom of using those waste flakes continued into Neolithic times in Ireland, as we find many of them which have been manufactured into scraping and pointed implements hardly distinguishable from those referred to of Palæolithic Age.

Again at Whitepark, which I take as a typical station, we find flakes manufactured for the sake of the flake itself. I have elsewhere stated that the flakes which were lying about as waste material at this

station numbered about twelve for every manufactured article,¹ but when studying these closely on the spot I found that they must almost all have been rejected as failures. I was able to collect a small number of good flakes, such as it was evidently the intention of the workman to produce, and comparing these flakes with the scrapers found in such abundance in this place I observed that they had curves round the end opposite the bulb of percussion similar to those on the scrapers themselves, also that they could be classed like the scrapers into those having curves which were circular, elliptical, oblique, etc. Those curves in the flakes were produced owing to the core from which they were derived, being, in the first instance, a rounded water-worn pebble or small boulder of flint. We can observe the method of manufacture that was followed. One of the small boulders was first split across, and then from its broken surface a series of flakes were struck off, the first one being an entirely outside flake like fig. 74, No. X.; then each of the other flakes of the first row would have its back, part outside and part fractured face, like figs. 69 and 76 in No. X. All the first row of flakes would carry off enough of the rounded part of the cores to give some kind of curve to the end opposite the bulb, as figs. 69 and 71 circular; 73, 74, and 75 oblique; 72 elliptical, etc. The second row of flakes would terminate a little lower down than the first row, and carry away a small margin of the original crust of the core. This small piece of original crust in either the first or second row of flakes gives a bevelled edge at once, and we find many instances of flakes of this kind being changed into scrapers by the slightest amount of dressing, half the original crust perhaps remaining, which lets us see plainly how the thing was done. Very good examples of this are seen in figs. 69 and 70, No. X., as in fig. 69 you have two views of a flake which has not been touched by dressing, while in fig. 70 you have one almost similar in shape, with a very slight amount of chipping round the margin, thus forming it into a scraper. The chipping is so slight that only part of the old crust has been removed. Figs. 77 and 78 are two small scraper flakes which fit on each other. Two views are shown of fig. 77.

The producers of flakes at Whitepark Bay appear to have set to work with the intention of manufacturing flakes suitable for scrapers. They were often successful in their work, but they had many failures. These failures were not all allowed to go to loss, for if any waste piece had a straight sharp edge it was almost certain to have been used in

¹ Proc., 3 Ser., vol. i., No. 5, p. 622.



No. X.—Flakes produced for making scrapers, Whitepark Bay, county Antrim.

scraping or cutting, as the marks of such use are frequently apparent.

There was also a specially made flake for our Irish hollow scrapers. These were short, thin, and flat flakes, having the back and front faces parallel. They are found in the sandhills, but finds of these flakes, some unworked, others partially or entirely made into hollow scrapers, have turned up. One such find occurred in a peat bog called Black Top, near Slemish, in the bottom of the bank, while a workman was cutting turf in the summer of 1898. There were forty-three pieces, of which nine were manufactured hollow scrapers, eleven good-sized flakes suitable for making into hollow scrapers, of which four are shown in the top row of No. XI. There were also ten flakes of the right sort, but small, which I consider would have been looked on as waste material, and there were ten flakes which, from their shape, I consider would have been unsuitable for hollow scrapers. There were, besides, three ordinary scrapers. Another find of similar flakes to those figured on first row of No. XI., all good and suitable for making into hollow scrapers, was got under a stone in bog in the townland of Moylurg, county Antrim, in September, 1898. In this find there were eleven flakes, a common scraper, and a long, narrow fabricator, which had been chipped into shape. I suspect there may have been some manufactured hollow scrapers in the find, which were sold separately. Although no finds of hollow scraper flakes have been obtained from the sandhills, yet the manufactured implements have been found in comparative abundance, and those separate finds of flakes give us considerable insight into the production of this class of implement. I show in the second row of No. XI. four hollow scrapers to enable anyone to compare the simple flake with the manufactured implement. Fig. 83 is a hollow scraper from the immediate neighbourhood of Slemish, fig. 84 from Portstewart, county Derry, fig. 85 from Bundoran, county Donegal, and fig. 86 from Dundrum, county Down. Such finds as I have mentioned show evident intention on the part of the makers to produce flakes suitable for manufacturing into hollow scrapers, and we have thus, in connexion with our sandhill finds, three well-marked kinds of flakes—winged flakes, scraper flakes, and hollow scraper flakes.

There are other well marked kinds of flakes in connexion with our Irish Stone Age, which though not abundant in the sand-hills are still represented there, while they are very plentiful in inland sites. The first kind I shall describe are pointed flakes. I show a series of these in No. XII. They are found abundantly in the Bann district, and some



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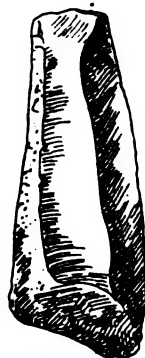
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91

Scale:—half linear



92

A. Knowles



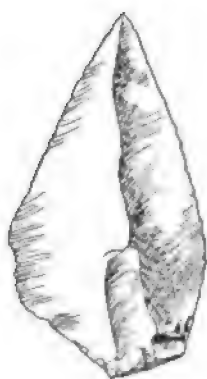
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No. XI.—Flint flakes of several kinds, and implements made from them.
Various sites.



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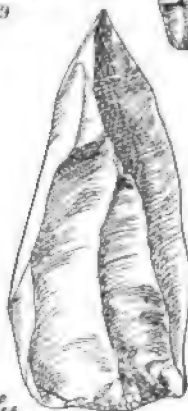
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102



103



104

H. Knowles 1901

Scale: - half linear

No. XII.—Pointed flint flakes. Various sites.

have a tang worked at the base to aid in fixing to a shaft or handle, see fig. 104, No. XII. Sometimes the point has also received a slight dressing, mostly on one side, possibly in order to equalise the sides. That a maker of flakes could set to work with the intention of producing pointed flakes is, I think, highly probable, as I recently obtained a find of thirty-four pointed flakes all found lying in one lump in the making of a drain near Dervock, county Antrim. Although these flakes were all apparently made of one kind of flint, yet I was unable to replace any of them, which would lead me to suspect that the workman had many failures, and only hid away the kind he wanted. No. XII., figs. 95 to 104, show examples of pointed flakes. Figs. 95 to 97, or the top row in No. XII., are a selection from the find of thirty-four which I have mentioned, and fig. 101 is one of another small find of six pointed flakes found together near Kella, county Antrim. The others are nearly all from the valley of the Bann, where, as I have mentioned, pointed flakes are found in considerable numbers. They would be suitable for either spear-points or as knives and daggers. Flakes of the Australian natives, having handles formed of gum, have a great likeness to our Irish pointed flakes, while those from the Admiralty Islands, mounted as spear-points, have also a close resemblance.

There is another kind of flake which I consider was equally the result of design on the part of the workman. This is a kind that is, as a rule, long and thin with sharp edges, and though the pointed flake may have been used as a knife as well as a spear-point or dagger, this was specially suited for knives or saws. Such flakes may have only one ridge down the back or they may have two or more ridges, but no matter whether they were triangular, flat, polygonal or outside flakes, all were evidently intended for the same purpose. They were probably used first without any trimming of the edges, as in the four examples shown in figs. 87 to 90, in No. XI., part of a find of 67 such flakes found near Portglenone, county Antrim. Eventually the marks of use begin to show on the edges, as in fig. 91, then there is a partial trimming of the edge, as in fig. 92, then both edges are trimmed, as in fig. 93, which it will be seen was an outside flake, with part of the outside crust showing up the centre of the implement. The most highly finished stage is shown in fig. 94 of No. XI., where the flake is carefully chipped over the entire back, which now shows an even curve, as will be seen in the section, while the under side of the flake still remains in a plain or undressed state. We find shorter knife-flakes, which, when manufactured into tools, have one of the edges of the flake

trimmed off, and in this condition forms the back of the knife. The other flake edge is used as the cutting part, and a short tang is worked for insertion into a handle. The Narin flakes were mostly of this kind, and over twenty beautifully made small knives were found at the sites near this place. See figs. 10 to 13, No. III., p. 344.

Again, we have very small flakes, whose only character as a separate class would be their smallness. Such flakes must have been carefully struck from the minute cores we so frequently find. I figure a specimen, one of many found at Portstewart, county Derry. See fig. 62, No. VIII., p. 363.

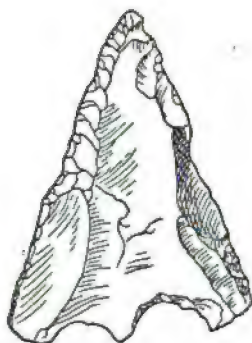
We have thus a number of well marked kinds of flakes—winged flakes, scraper flakes, hollow scraper flakes, pointed flakes, and knife flakes. The first kind were the refuse produced in manufacturing our larger implements, but found to be useful for chopping, scraping or cutting, and therefore were utilized. All the others were produced specially as flakes, and I believe that each kind was the product of design on the part of the makers. The divisions I have outlined may not be full enough to include all kinds, but some such classification as I have mentioned seems to me the only natural way to arrange these much-neglected but interesting objects. Other class names, different from those adopted by me, may be given. Some of those I have used may have been applied before, and are often applied to the objects in spoken language. The names are nothing. It is the evident design that was in the mind of the workman to produce such kinds of flakes as he required, and his ability to do so, which I wish particularly to draw attention to.

ARROW-HEADS.

Although arrow-heads from the sand-hills are few, as compared with scrapers, yet a good number has been collected from various sites. From Whitepark Bay a series of very coarse objects has been found which may be called arrow-heads. Perhaps they may be only partially made, but, I believe, they would be effective enough in their present form, and as scarcely anything better of this kind has turned up there, I think we must look on them as completed implements. Two of these coarse arrow-heads are shown in figs. 105, 106, No. XIII. Two others of the same class are shown in the first report, figs. 4 and 7, No. XII., and two more in the second report, figs. 11 and 12, No. XXIII., all from Whitepark Bay. I show in fig. 108 a partly made arrow-head from Portstewart. It is only chipped round the edges on the face shown.



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106



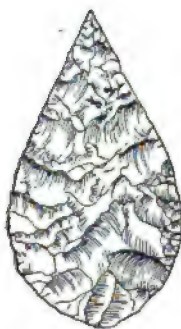
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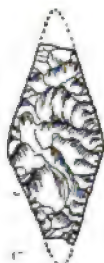


110



112

M. Knecht, 1901



113



114

Natural size.

No. XIII.—Flint arrow-heads. Various sites.

On the under side there is only a very small piece dressed near the point. The stem and barbs do not seem to have been fully formed, and all the undressed parts show the original faces of the flake from which the implement was formed. We might, therefore, look on this specimen as an arrow-head in process of development, and I drew attention to it in the *Journal of the Royal Historical and Archaeological Association of Ireland*, vol. viii., p. 232. Yet I have no doubt it would be serviceable in its present condition, and if the workman had taken a further series of chips all round from both faces, I imagine it would then have presented an appearance similar to fig. 109, which is also a very perfect and well-chipped arrow-head from Portstewart. Very fine and perfect arrow-heads have been found at Dundrum. Figs. 107 and 110 are two handsome leaf-shaped specimens. Fig. 112 is stemmed and barbed, and is also a handsome well-made implement from same place, and fig. 113, an imperfect diamond-shaped arrow-head, is also from the Dundrum sites. There are many examples from this place showing the process of development from the simple flake. An arrow-head from Portstewart, with indenture in base, is shown in fig. 114, No. XIII. The figures shown on No. XIII., together with those referred to as previously figured, and also the specimens figured on Pl. XIII. of first report from Bundoran, give a fair idea of the types of arrow-heads found in the sand-hill sites. The leaf-shaped is the most abundant, stemmed and barbed come next, then the indented, and lastly the diamond-shape. As far as I know, specimens of spear-heads, with polished faces, have not been found in any of the sand-hills, nor were any examples found of the allied kite-shaped variety without polishing.

The question has been put to me, Were any arrow-heads ever dug out of the black layer? The coarse badly made implements from Whitepark Bay were undoubtedly dug out by myself from the pre-historic surface in connexion with other remains, but in the other sites I cannot call to recollection any instance of an arrow-head having been excavated from an undisturbed piece of old surface. Yet this is not to be considered strange when we take into account the large amount of old surface one may sometimes dig without finding anything, and a small arrow-head would be hard to find even if a spadeful containing it was turned over, whilst flint arrow-heads, and other objects, are easily observed, owing to their whitish colour, after the rain and wind have removed the material in which they were imbedded. I suppose the question is meant to show doubt as to arrow-heads being of the same age as the other objects which have been excavated from

the old surface. I think there is no one who would say that arrow-heads ceased to be made or used the moment bronze was introduced into this country. I should say that more than most other implements arrow-heads would continue in use for a considerable time after the introduction of implements of metal, but at the same time they were mainly of Neolithic age, and even had their origin in Palæolithic times.

The names applied to the various kinds of arrow-heads are taken from the classification recommended by myself (see *Journal Anthropological Institute* for May, 1877). I endeavoured to make the divisions sufficiently distinct, and yet retain the old terms that had been long in use. I considered that we could include our arrow and spear-heads under the following divisions:—Stemmed, indented, triangular, leaf shaped, kite shaped, and lozenge shaped. I hope in a short time to take up the subject again, and give illustrations of the different types.

We do not know whether the people of the western sites, where there was no flint, used bows and arrows, and if so, how they would tip their arrows. Some savage nations have used hard wood, bone, and also pieces of shell for their arrow-points. The Irish Neolithic people of the south and west may have acted somewhat similarly, but this is a question that is still open for investigation.

RUDE FLAKES AND SPALLS AS TOOLS.

In my last report to the Academy I stated my belief that flakes and splinters of hard rock found in various sites, especially those in Donegal and the west coast of Ireland, which were far removed from the flint producing rocks, were used with little or no dressing as knives, scrapers, choppers, and axes. Further experience convinces me that the use of such rude objects for temporary tools was much practised. I have mentioned the use made of the sharp edges of flakes, which might be regarded as failures, at Whitepark Bay. Those referred to would perhaps cut as well as the best made flakes, and they seem to have been turned to account in a temporary way. I show a few of the rude objects from sites where flint is absent in No. VII., and have already described them. The edges of all show marks of use. The knife-like flake with section, shown in fig. 34, and which was found at Ballybunnion, has the marks of use as a knife or chopper, but this is not intentional dressing, as might appear from the figure. In the sites of the West of Ireland the people of the Stone Age had no better material for implements than the coarse crystalline rocks found there,

and it shows great resourcefulness to have turned such rocks as were available to useful account. One would have expected that the people might have dressed the boulders into fine cutting implements, and polished them. Perhaps they may have done so though we have not found the implements. Perhaps the rock was not suitable for grinding into axes which may be most likely, as we find when a tough close-grained rock turned up, as at Fisherstreet, county Clare, such tools have been made. In other sites a flake produced from a water worn boulder gave an edge which would cut for a time pretty well, and as the material was unlimited they could never be at a loss for a fresh implement when required. At Ballykinler, in September, 1900, I found among a lot of bones of cow and pig a large spall of blackish rock about three or four pounds in weight; it looked like a piece of rough rock which had never been used for any purpose, but when I took it up in my hand I found it had a rude edge and a handle dressed on it at one end. It could be easily handled and used as a chopper. It must have been used for smashing the bones to obtain the marrow. I have already mentioned this object, and I have shown it on p. 341, fig. 9 b.

ANVIL STONES.

The objects which I have called anvil stones in my present and previous reports and papers occur frequently with the other prehistoric remains in the sand-hills. They have marks on the sides which sometimes appear only as roughened spots, and in others as pretty deep cup-like hollows. We find the marks in all stages shading from the one extreme to the other, and leading to the belief that the continued use of the stone as an anvil caused the originally roughened spots to wear in time into a hollow. When the hollows became deep, so that they nearly met in the centre, the use of the stone as an anvil would seem to have ceased, the bottom of the cavity was nicely smoothed, and the hollow would then seem to have been turned to some other use. Many things could be ground or mixed in these cups, paint for ornamenting their person among the rest.

Anvil-stones are usually waterworn stones of about a pound in weight, but some are much larger, and occasionally the ends as well as the sides are roughened as if they had also been used as hammer-stones. The roughened pits on the sides were therefore believed by some authors to be made for the purpose of enabling "the thumb and fingers to take a sufficiently secure hold of the stone to prevent it readily falling out of the hand when not tightly grasped. . . . If, as

seems probable, many of these hammers or pounders were used for the purpose of splitting bones so as to lay bare the marrow, we can understand the necessity of roughening a portion of the greasy surface of the stone to assist the hold."¹ The fact that very few hammer-stones have roughened spots on the sides, and that very few anvil-stones with the roughened spots on the sides show marks of use as hammers on the ends seem to me a great objection to this theory. There is a further difficulty; in many cases where stones are well roughened on the sides they would be too heavy for use between the fingers and thumb. A great number of anvil-stones are split through the centre into two or more parts, an occurrence which would be likely enough to arise if the pressure was all in the centre as would be the case when used as an anvil, but not likely to happen if the stone is held by the fingers and thumb in the hollow parts in order to hammer with the ends. See example of a broken specimen from Fanore, county Clare, found by Dr. George Fogarty, R.N., in fig. 24, No. V. Only about a fourth part of the implement was found. Like many examples from other sandhills it is broken through the centre.

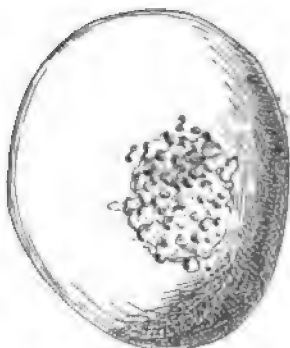
I show a series of these stones in No. XIV. In fig. 115 I show a specimen which I excavated from the prehistoric surface at Whitepark Bay. The roughening on the sides is very slight, and it appears to me that instead of the marks being made to give a better grip with the finger and thumb, the stone was being used as an anvil, and not remaining steady it caused the core or stone being operated on, to jerk to the side, thus causing lines which run from the roughened surface to the margin of the stone. In fig. 116 which was found at Dundrum, county Down, the roughened part is broader than in the previous specimens, but has not reached any perceptible depth below the surface, and unlike the last specimen it has a roughened spot only on one side of the stone. Another example from Dundrum is shown in fig. 117. The roughened spots are of considerable depth on both sides of this stone, but the sides and bottoms of the hollows remain in a rough pecked state. In fig. 118, also from Dundrum, the deepened cup-shaped hollows are smoothed in the bottom, though still showing some of the original roughness round the margins. We see in fig. 119 an example having the hollows in the most perfect state of smoothness, though they are not polished.² The inside of the cup shows the same

¹ Evans "Stone Implements," 2nd ed., p. 243.

² We must not mistake anvil-stones for stones with hollows in which a stone pivot has run which was probably the end of an upright shaft of a corn mill. Holes of this kind are much glazed, and show marks of the constant circular motion.



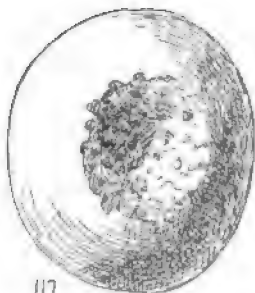
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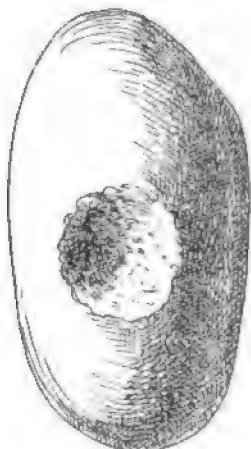
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119



117



118

M. Knowles
1901

Scale - half linear

No. XIV.—Anvil stones. Various sites.

kind of smoothing that is seen on the ends of some hammer-stones which, from the first use of hammering would appear to have been changed into instruments for rubbing or grinding. Another anvil-stone from Dundrum, part of a separate find, and hollowed on only one side, has already been mentioned. It is shown in fig. 8, No. II.

Anvil-stones are called oval tool-stones by some authors, and *tilhuggersteins* by Danish antiquaries. Some English authorities have expressed doubts as to their belonging to the Stone Age. This idea may have arisen from the finding of such implements in association with bronze or iron tools, but I think that their survival would only show that, like many other useful articles, they were continued into an age later than that in which they originated. They would appear to have been in use in the later Palæolithic Age, and to have descended to a later period than the Neolithic Age.

I believe there can be no doubt that such stones were used for the purpose of a rest for the core or piece of flint while being operated on, just as the blacksmith uses his anvil as a rest while striking the iron, and therefore I have called them anvil-stones. I have drawn attention to them for the last thirty years.

In a Paper which I read before the Anthropological Institute in June, 1876, which is published in vol. vi., page 485, of their *Journal*, Sir John Evans, who was president for that year, in his Anniversary Address, published in vol. vii., in referring to my Paper, at p. 519 says:—"This paper is supplementary to one which was read at the British Association at Belfast, giving an account of a large number of stone implements and bones in the sand-hills, near the shore at Londonderry. Among the objects found is one of the so-called oval tool-stones which the author regards as being of the same age as the flint implements found at Portstewart, and in the county adjoining, and as having been used in their manufacture. He can hardly have been aware that the same class of tool-stones is found in Scandinavia, often associated with iron weapons and tools, as, for instance, in the Thorsbjerg moss find."

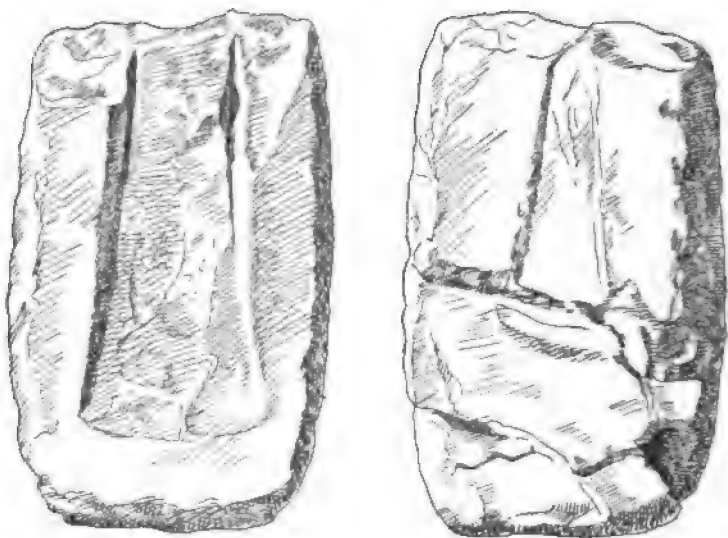
Again, at p. 523, he says, in reference to another Paper on my finds near Ballintoy (Whitepark Bay):—"Like those from Portstewart, these objects are found near the sea-shore, but in this case there appears to have been some traces of habitations, and possibly old floors . . . In the wall of one of their dwelling-places a so-called oval tool-stone was found which the author regards as belonging to the Stone Age. As I have already observed, there can be no doubt of the analogous form in Denmark belonging to the Early Iron Age. I can

see no reason for assigning an earlier date to the Irish specimens, but if in this instance the tool-stones and the scrapers could be proved to be contemporaneous, I should more readily accept the scrapers as belonging to the Age of Iron than I should the tool-stone as belonging to that of Stone."

Sir John Evans has never contradicted these statements in any publication that I have seen, but a considerable time after they were made he took an opportunity of informing me, I think at the Sheffield Meeting of the British Association, that he was mistaken in the opinions he had expressed, and was sorry he had made the statements quoted above.

FINDS OF ARTICLES BELONGING TO BRONZE AND IRON AGES.

In previous reports I have referred to finds of bronze pins and other objects of even later date, which have been hidden or lost in the sand-hills, and when the sands had been blown away, dropped down



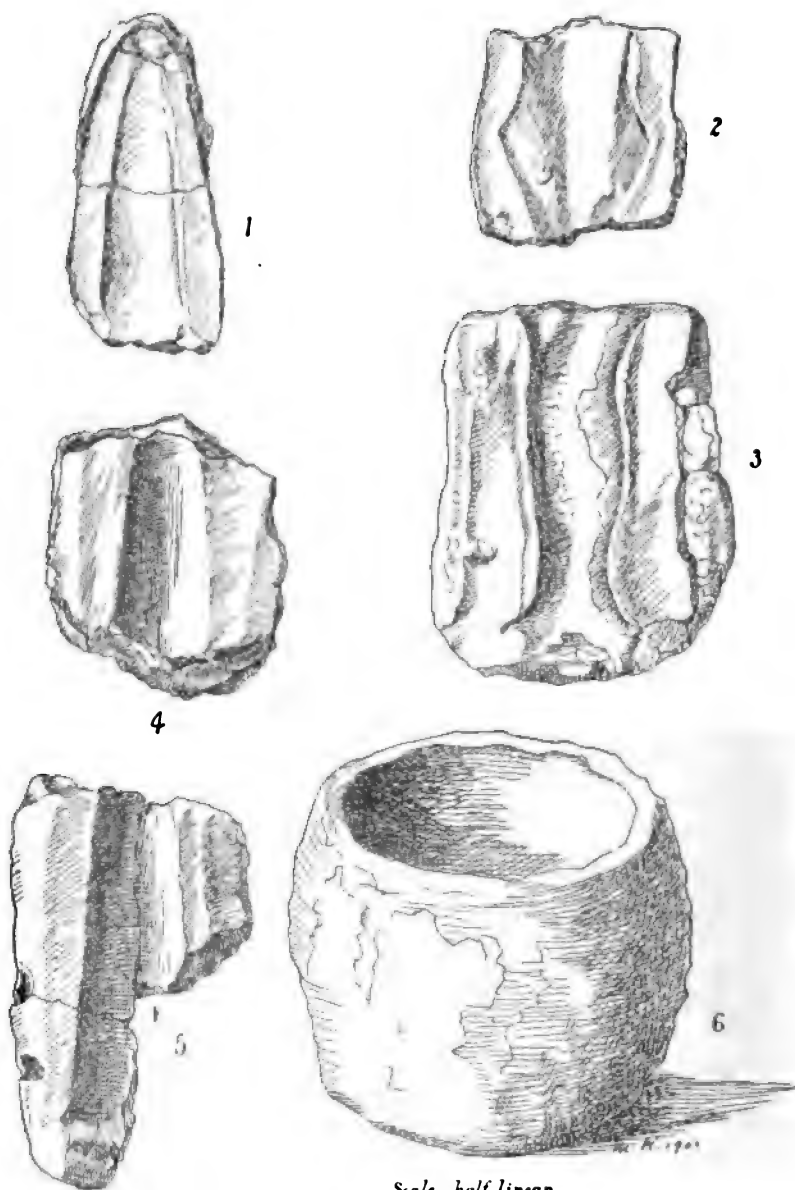
Scale:- half linear

1a

No. XV.

to a level with the remains belonging to the Stone Age, and even got mixed with them. The Ballyness find of bronze pins, tradesmen's

tokens, and objects of later date, which fell down to a level with the Stone Age Settlements, when a covering of 30 feet of sand was blown away, is a case of the kind I refer to (see 3rd series, vol. i., No. 5, p. 615). The bronze pins found here and in other sites did not belong to the Bronze Age, but to a much later time, and as far as I had heard at the date of publishing my last report, no objects of the Bronze Age had been found in any of the sites. The Rev. W. A. Adams has, however, since found, at Whitepark Bay, a mould for casting a bronze winged celt (see No. XV.). This was picked up on the surface, and it is therefore easy to explain that it must have descended from a higher level when the sands were blown away; but Mr. Adams has found on top of a mound of chalk rock in the sand-hills of Whitepark Bay among black charred material, a small vessel of coarse pottery, 3 inches high, and of about 3 inches in width throughout; only at the mouth it is 3 inches wide in one direction, and $3\frac{1}{2}$ inches at right angles, which gives the idea when looking sideways, that the vessel has a sort of spout (see No. XVI., fig. 6). It was found resting on a small piece of basaltic rock, and a similar small piece of rock rested on the top. On taking it up he found parts of moulds for casting bronze swords firmly attached to the side of the vessel, which with difficulty he got removed, and on clearing out the vessel, he found fragments of bronze inside. The portions of the moulds for the sword are formed of coarse clay outside, with a mixture of fine sand and clay, lining the coarser material. He has found two pieces which apparently fit each other, where the handle is attached to the blade, and digging round about he got some more fragments of moulds, with parts of another mould for a bronze spear-head (No. XVI., figs. 4, 5). A small hole runs lengthwise through the coarse outer parts of the various moulds, which was intended to be represented in the figures, but was overlooked. A mould of similar kind is shown by W. F. Wakeman in the *Journal Royal Soc. Antiq., Ireland* (see vol. v., fig. 4, p. 109). A fragment of a mould, of same class, from Boho, county Fermanagh, is in the Academy's collection. It also has a hole running lengthwise along the back. He also found a stone which had been used for rubbing or grinding something on, possibly as suggested by Mr. Adams for grinding the clay and sand to make the fine lining inside the sword moulds. All these objects, he says, were dug from the black layer, and he brought away the full of the little vessel of the black matter composing the layer, which is apparently entirely wood charcoal. Three pieces of sword moulds, and two of spear moulds, are shown, the former in figs. 1, 2, 3, and the latter in 4, 5, No. XVI.

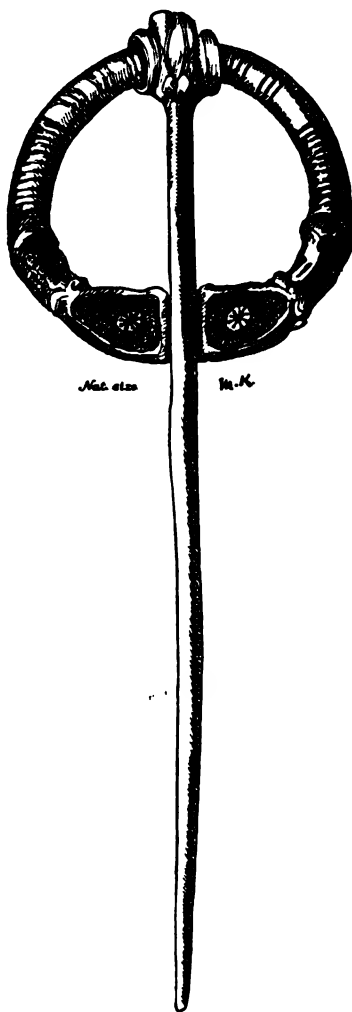


Scale.—half linear.

No. XVI.—Clay moulds for swords and spears, and clay vessel, Whitepark Bay, county Antrim.

When one meets with a portion of blackened soil like this, in which the moulds and little vessel were found, it is called the black layer; but we must remember that any people of a later date than those of the Stone Age, by erecting huts and making fires, would also soon leave a black layer in the sand. I have even found where illicit distillers of a very recent date had made a deceptive black layer. We are therefore not to conclude without good evidence, that the black layer from which Mr. Adams excavated his interesting find, was a black layer of the Stone Age. Whitepark Bay was a retired and attractive place at any age; it is all that even now, and the explanation of the find I am now dealing with seems to me to be simply this:—some bronze-age smiths came this way, placed their fires on a suitable spot, made their moulds and crucibles, and cast one or more bronze swords and spears, and then went off, leaving everything in order should they return again, which they would appear never to have done. The mould of stone for casting a bronze celt was found at a considerable distance from the place where the sword and spear moulds were found, and I should therefore think that Bronze Age people had frequently visited Whitepark Bay, and made it a place of temporary residence.

It will be observed in reading the foregoing report, that there is frequent mention of bronze pins and other objects of bronze and iron having been found. These have all been mentioned because they



No. XVII.—Brooch.

are interesting; but there is no difficulty in the way of a correct interpretation of their frequency of occurrence in different sand-hills. As I have often explained, these have been hidden or lost at periods perhaps long distant from each other; but the sand in which they were embedded being blown away, all were brought to one level.

As I previously mentioned, Mr. Travers King found three bronze pins at Horn Head during the summer of 1900, one of which has an ornament of red enamel well preserved. I also had sent me a handsome bronze brooch which was found while pulling bent in sandhills near Castleport, Co. Donegal (No. XVII.). The expanded ends of the brooch are filled with red enamel which is still preserved, though pitted and rendered rough by weathering. In the centre of each red space is a setting of glass showing eighteen lines, alternately blue and white, radiating from an oval red spot, in the centre of which is a dot of blue. The whole setting does not measure more than $\frac{1}{4}$ of an inch in diameter. It is therefore much more minute and elaborate in its parts than a somewhat similar setting in the head of a pin found at Clonmacnois, described by Miss Stokes (see "*Early Christian Art in Ireland*," p. 79, fig. 28).

This brooch is shown in No. XVII., p. 387.

CONCLUDING REMARKS.

When I first began to report on the prehistoric remains from the sandhills I was practically alone in that sort of work. Now many antiquaries and students of Archæology have come to my assistance, and by their aid a great part of the coast of Ireland has been examined and remains found where they were not previously suspected to exist. Many places have not yet been examined at all. Some have only received a very cursory examination, and none have been thoroughly worked out. It is, however, satisfactory to know where the places are which contain prehistoric remains, and what the sites are likely to yield to the diligent explorer. The Limerick Field Club, I am glad to learn, are fully alive to the importance of the finds in county Clare, and I hope by their means to see those sites more fully explored. The rock used for axes at Fisherstreet is, I am informed by Professor Cole, a fine grained clayey flagstone, and belongs to the coal measure series. Being more compact and suitable for cutting tools than other rocks found on the west coast of Ireland, I should expect that more implements of that material will yet be found.

There are still many places unexplored, especially islands off the

coast. There is also a large extent of coast from Sligo southwards as far as Achill, which has received little attention. I have visited Killala, in Mayo, and reported on it, but that is all that has been done in the district in question. Mr. Coffey has found indications of prehistoric occupation on the Wexford coast, and Mr. Ussher has found remains of Great Auk in sites examined by him near Waterford. I hope to be able to examine the sites in Waterford where those bones were found, and also the Clare sites during the ensuing summer. Some parts of the south coast, especially county Cork, have also yet to be explored.

The question may be asked, Who were these people who at one time seem to have occupied the whole coast of Ireland, living largely on shellfish, and having nothing better in the nature of tools than those rude implements of stone, some of which are figured in this report? Were they in any way connected with the history or traditions so familiar to us in our *Annals*? I believe we must still count relationship with these poor people though the invasions and great deeds mentioned in our records refer, I think, to a metal-using people.

Professor Boyd Dawkins says that "various researches reveal the important fact that the population of the British Isles was uniform in character through the whole of the Neolithic Age." That it is impossible to doubt that the whole of the British Isles was inhabited from the beginning to the close of the Neolithic Age by the same small race in the same stage of culture." That "at one period in the Neolithic Age the population of Europe west of the Rhine and north of the Alps was uniform in physique and consisted of the same small people as the Neolithic inhabitants of Great Britain and Ireland, and "that the Basque-speaking people are to be looked upon as a fragment of the race which occupied the British Isles, and the area west of the Rhine and north of the Alps in the Neolithic Age." This people according to the same high authority, is represented by the small swarthy Welshman, with long head and Iberian physique; in Scotland, by the small dark Highlander, and in Ireland by the black Celts west of the Shannon. And also that they "are still amply represented in the present population."¹ These statements from Professor Boyd Dawkin's work, which are supported by other weighty authority, tell the story more plainly than I could do, and show that we have an interest in these people of the Stone Age and that, though there is no doubt a great mixture in our blood, we must still count them among our ancestors.

¹ "Early Man in Britain," pp. 310-331.

XXI.

NOTES ON CICERO'S CORRESPONDENCE DURING HIS PROCONSULATE. BY L. C. PURSER, LITT. D.

[Read FEBRUARY 11, 1901.]

Ad Atticum v. 1. 2.—De Oppio factum est ut volui et maxime quod
DCCC aperuisti.

THERE is no need to add *de* before DCCC. Cicero uses *aperire* in the usual sense of bringing to light what is concealed. Atticus unearthed a debt due by Cicero to Oppius; and later on told Oppius about it: cf. 4. 3 *De Oppio bene curasti quod ei de DCCC exposuisti*. Cicero approved of the action of Atticus, and asked him to see that the business was settled (*explicatum*, 5. 2) before he left Rome. It would appear to have been really a debt to Caesar (cf. *Att.* v. 6. 2; 10. 4), whose agents were Oppius and Balbus: cf. also *Att.* vii. 3. 11; 8. 5.

v. 1. 5.—Cui me ad te scripsisse aliquid in sermone significes velim.

The margin of Lambinus's edition adds <*de se*> after *te*: Müller, more correctly, would place it after *scripsisse*. But the sentence cannot bear its omission.

v. 2. 1.—In Trebulano.

Mommsen, in *C. I. L.* x. p. 442, speaks of three Trebulae, Trebula Mutuesca, Trebula Suffenas, and the Trebula north of Capua. But he adds in a note, "Contra Trebullanum cuius mentio fit apud Ciceronem *Att.* v. 3. 4: vii. 2. 2; 3. 12 rus fuit situm inter Pompeios et Beneventum." This is quite possible; but it seems strange that there should be another district called Trebula so near (comparatively) to the one north of Capua. I incline to think that the villa of Pontius lay in this latter district. No doubt it seems an extraordinary route for Cicero to take; but he was "creeping like snail unwillingly" to his province, and catching at any reasonable excuse to dawdle on the way. And he seems him-

self to acknowledge that the route was strange when he says, *doinde cogitabam sine ulla mora iusta itinera facere*. If the Trebulanum was where Mommsen places it, a letter would hardly have been delivered there *tertio die* from Rome (3. 1). The distance would be about the same as to Pompeii, and it was exceptional for a letter to reach that town sooner than the fourth day (cf. Att. xiv. 18. 1 *tuas litteras vesperi acceperam in Pompeiano, sane celeriter tertio abs te die*).

v. 2. 3.—De republica scribas ad me velim si quid erit, quod [†]operare.

The attractive correction of Ursinus, *odorere*, is adopted by most editors, including C. F. W. Müller. Ascensius, followed by Baiter, reads *opperiare*, meaning, I suppose, 'which you are waiting for.' The simplest alteration would be *quod operae est*, 'which is of consequence,' 'worth while (writing about).' The phrase *operae esse* is often used affirmatively: cf. Liv. ix. 23. 12, *castra habeant repetantque, quibus operae est trahere bellum*; and the well-known line of Ennius (Ann. 483, ed. L. Müller), *Lunai portum, est operae, cognoscite, cives*. On the phrase see Mr. Stanley in the *Classical Review*, viii. 345, and Roby, ii., p. xlix, and § 1283.

v. 3. 1.—Quid de his cogites et quando scire velim.

Madvig (Adv. Crit. iii. 175) rightly looks for the corruption in *his*. He supposes the allusion is to Atticus's journey, and conjectures *villis*. Ussing suggests *viss*, and this seems preferable. But I think it more probable that Cicero is referring to his debt to Oppius, which he mentions in so many letters of this period: cf. 1. 2; 4. 3; 5. 2; and I suggest *Quid de HS DCCC cogites et quando* (sc. soluturus sis) *scire velim*. The number would be readily omitted once *HS* became corrupted into *his*.

v. 3. 2.—Litterae, quarum alterae edictum [†]publi li michi habebant.

This is usually altered to *P. Licini*; but the commentators do not decide what Licinius is referred to. Schiche (Zu Cicero's Briefwechsel im Jahre 51: Berlin Progr. 1895, pp. 6, 7) argues strongly for reading *P. Lentuli*, i.e. Cicero's friend P. Lentulus Spinther, who was governor of Cilicia before Appius Claudius. The objection to this is that *Lentuli* is not very like *li michi*. I would rather suppose that the reference is to the edict of Mucius Scaevola, which Cicero appears to have used: cf. Att. vi. 1. 15 *Ego tamen habeo* (exceptionem) *ισοδυνα-*

μῦθος *sed tectiorem ex Q. Muci P. F. edicto Asiatico*; and suppose that *Muci* got out of place, and *P. F.* was written in an extended form. Accordingly we might read *Q. Muci P. F.*

v. 4. 3.—De Sicinio.

The other names mentioned in this passage are those of officers in Cicero's suite, and of Sicinius we do not hear elsewhere in Cicero's epistles. Malaspina reads *de Licinio*, referring to the ordinary reading in 3. 2. Possibly we should read *Mescinio*. Mescinius was Cicero's quaestor.

v. 4. 4.—Dum acta et rumores, vel etiam si qua certa habes de Caesare, exspecto.

The attractive emendation of Madvig (*Dumtaxat* for *Dum acta et*) has met with a large measure of approval, and is adopted by Müller. It may be right; though it is not plain why Cicero should ask explicitly *only* for rumours here, when he asks for *non modo res omnes sed etiam rumores* in 5. 1. It would be simpler perhaps to read *Diu acta et rumores*.

v. 7.—Proficiscebar Brundisium a. d. xiiii Kal. Iunias.

The date is confessedly in error. Cicero arrived in Tarentum xv Kal. Iun. (i.e. on May 18). and intended to wait in that town for the arrival of Pomptinus. On the 19th he wrote Att. v. 6, in which he states that Pompey had asked him to spend every day (*cotidie*) of his sojourn in Tarentum in his company. He appears to have spent three days (*triduum*) with Pompey, and then left for Brundisium, where he arrived xi Kal (Fam. iii. 3. 1). The journey from Tarentum to Brundisium, though some 45 miles at least, was probably performed by Cicero in one day, as it was in 58 B.C. (cf. Att. iii. 6, and 7. 1). So the arrangement of Cicero's time would seem to have been—

Arrival at Tarentum May 18, xv Kal.

Three days there with Pompey, May 19, 20, 21, xiv-xii Kal.

Departure for Brundisium, May 22 (early), xi Kal.

Arrival at Brundisium, May 22 (late), xi Kal.

We must accordingly read xi for xiiii. This may have been a mere mistake, as e.g. in Fam. xiv. 5 fin. the MSS. have xv. where Sternkopf¹ has conclusively proved that we must read xvii: cf. also

¹ Quaest. Chron. (1884), p. 35.

below, Att. v. 10. 1, where the MSS. give xv, but v must be right. But as we have seen that Cicero had a long day's journey before him, he probably started early; and I suggest that *iii* is a corruption of *HI* (= hora prima): cf. Bücheler's emendation in Att. xv. 4, init., *HX* for *IIX* of the MSS. When the copyist found *iii* coming after *Iunias*, he supposed that it had to do with the number immediately preceding, and transposed it.

Schiche's view (*op. cit.* pp. 7, 8)—that we should read *xiii*, supposing that the triduum spent with Pompey comprised part of the day of arrival at Tarentum, viz. the 18th, the whole of the 19th, and part of the 20th—unduly contracts the time spent at Tarentum, which Pompey's language (*cotidie*) would seem to imply was more than one clear day, or even a day and a-half; and unduly lengthens the time spent on the uninviting journey between Tarentum and Brundisium. According to Schiche's views, we must suppose three days, or portions of three days, spent on the road, which seems improbable.

v. 8. 3.—Scripsi etiam ad Camillum <ad Caelium> ad Lamiam.

This was about the goods of Milo. The words *ad Caelium* are the admirable addition of Schiche. His arguments are convincing (*op. cit.* pp. 11, 12). Cicero did write to Caelius on the subject, cf. Fam. viii. 3. 2, and most probably from Brundisium,¹ from whence he wrote to Atticus, Camillus and Lamia. Again, it was unlikely that he would have written on the subject to Atticus who, he feared, was absent from Rome (§ 2), and would not have written at the same time to Caelius, who he knew was at Rome. The 'asyndeton bimembre' may of course be defended to some extent (cf. Lehmann, *Quaest.* p. 25), but it seems uncalled for here. Lastly, the omission is very likely to have occurred owing to the similarity of *Cāilla* and *Caelia*.

v. 9. 1.—sine impedimentis.

Sin eis impedimentis M¹ *sine iis imp.* M² *sine imp.* Σ, s, c, (cf. Lehmann De epp. ad Att. recensendis p. 70). This latter reading is to be adopted, as it is so well supported. The readings of M would lead one to conjecture *sine meis imp.*

v. 10. 3.—Dices: 'Quid adhuc? Nondum enim in negotio versaris? Nescio et puto molestiora restare.

It is quite plain that *Nescio* spoils the sense. It is just the

¹ Cf. O. E. Schmidt, *Briefwechsel*, p. 75.

opposite we want. C. F. W. Müller reads <Nec> *nescio*: Kahnt *San- scio*, which Mr. Tyrrell and I adopted in our edition in preference to *scio* of Schütz and Baiter. But none of these corruptions was likely to have taken place. Perhaps *Ne ego scio*, i.e. *nescio*, 'Verily, I know it.'

v. 10. 4.—*ac non modo nemo ꝑmodo ne Roma quidem quisquam.*

So the MSS. The simple correction of Kayser approved by Madvig (Adv. Crit. ii. p. 235) *nemo domo <sed> ne* remedies the passage perfectly. The confusion of *domo* and *modo* is one of the commonest of errors: cf. Plaut. *Stich.* 623, where the Ambrosian makes the mistake: also Verg. *Æn.* x. 141: Plaut. *Men.* 803; *Mil. Arg.* 1. 13. and 484: Cic. *Fam.* ii. 16. 4 *modesticis* for *domesticis*. C. F. W. Müller reads *non modo homo sed ne rumor quisquam*, which is no doubt idiomatic as regards the first clause, but leaves the irregular collocation of *quisquam* with the name of a thing.

v. 10. 5.—*Valde me Athenae delectarunt urbe dumtaxat et urbis ornamento et hominum amore in te et in nos quadam benevolentia; sed multum ꝑea philosophia sursum deorsum, si quidem est in Aristo apud quem eram.*

That *sursum deorsum* is predicate (like *susque deque* in Att. xiv. 6. 1, as Schiche, *op. cit.*, p. 16, points out) seems certain, and indicates the 'topsy-turvy' nature of the philosophy at the time. Aristus was the head of the younger generation who grew up under the influence of the eclectic Antiochus. He is often mentioned in Cicero (see Reid on Acad. i. 12, and Zeller, 'Eclectics,' p. 100, Eng. Trans.). The doctrines of the Academy were almost entirely abandoned (*quam nunc prope orbam esse in ipsa Graecia intellego*, Cic. *N. D.* i. 11); and the new philosophy (so-called) of Eclecticism seemed to have come into fashion. Possibly then we should read *sed multum ꝑ vía φιλοσοφία*, and there would be the same touch of scorn in the word *vía* that we find in *adulescentioris Academiae* in *Fam.* ix. 8. 1, and in the expression, "The New Learning" of to-day.

Zeller (*l. c.*) says of Aristus that Cicero "describes him as the only man who formed an exception to the generally unsatisfactory state of philosophy at Athens." Zeller would seem to read *si quidem est*, <est> in *Aristo*. But I think that the reading of the MSS. more accurately expresses Cicero's opinion of Aristus. Even in a formal treatise, not merely in a private letter, Cicero implies that he did not

rank Aristus high as a philosopher. In Tusc. v. 22, 23 he mentions a discussion he had with Aristus during this stay at Athens. He concludes by saying, *Hæc nunc enucleare non ita necesse est, quamquam non constantissime dici mihi videntur*. He doubtless held the same opinion of Aristus that Plutarch did (Brut. 2) Ἄριστον, ἄνδρα τῇ μὲν ἐν λόγοις ἔξει πολλῶν φιλοσόφων λειπόμενον, εὐταξίᾳ δὲ καὶ πραότητι τοῖς πρώτοις ἐνάμειλλον.

In the beginning of the sentence (which is printed according to the reading of most editors), I incline to think that we should read *urbs duntaxat et urbis ornamentum et hominum amores in te <et> in nos quaedam benevolentia*. This is the reading of M, except that it has *turbs* for *urbs*, omits *et* before *in*, and has *quadam* for *quaedam*. But once the *t* of *delectarunt* was added on to *urbs*, *turbs* would have been altered to *turbe*. *Urbs* is found in v. c. and most of Malaspina's MSS., and *quaedam* is found in F and cod. Bononiensis.

v. 11. 6.—Nunc redeo ad quae mihi mandas : in praefectis excusatio iis quos voles deferto.

In 7 we read that Pompey stated *se quinos praefectos delaturum novos vacationis iudicariae causa*, which would seem to show that praefectures were often sinecures, appointed merely to confer exemption from service on juries. Yet we cannot be quite certain that this privilege of exemption was fully recognised : it savoured too much of a job. Atticus probably asked Cicero to allow him to appoint certain nominal praefects, so that they might have this exemption : if (says Cicero) they really have this exemption, return (to the aerarium) what names you please. Thus we might read *si praefectis excusatio sit, quos voles deferto*. I also thought of *si praefectis excusatio, duos (ii^m) quos voles deferto* : and this would represent a less wholesale grant of patronage than the other : and it would be more in accordance with the character of Cicero, for he was, comparatively speaking, averse from jobs.

v. 11. 7.—Brundisio quae tibi epistolae redditae sunt sine mea, tum videlicet datas, cum ego me non belle haberem.

The MSS. give *datas* : and, as Mr. Tyrrell has shown, this construction of *videlicet* is an ordinary colloquialism ; cf. Plaut. *Stich.* 555, 557 *Videlicet parcum fuisse illum senem, qui id dixerit. . . . Videlicet inaequom fuisse illum adulescentem, qui ilico . . . denegarit*. A similar use of *scilicet* is found in Att. xiii. 5. 1. In both these passages C. F.

W. Müller has retained the MS. reading, and rightly refused to accept any of the alterations proposed.

v. 12. fin.—Nunc eram plane in medio mari.

These words would appear capable of bearing but one meaning, viz., 'now I am absolutely in the open sea.' But in § 1 *Itaque erat in animo meo nihil festinare nec me Delo¹ movere nisi omnia ἀπα Γυπέων² pura vidissem* would seem to show that Cicero wrote this letter, not in the open sea, but at Delos. Hence it has been held by O. E. Schmidt (*Briefwechsel*, p. 76) that *in medio mari* means "auf dem ringsumfluteten Eiland," i.e. at Delos, the island in the midst of the sea. This is extraordinarily ingenious, and if supported by a parallel would claim acceptance. But perhaps another explanation is possible. Cicero began the letter at Delos, and wrote there § 1 and probably § 2. The weather proved favourable, and before he could find a messenger to take his letter to Rome, he set sail for Ephesus. Having got out to sea, in the most open stage of his journey (that between Delos and Icaria), he probably wrote § 3. Cicero often wrote portions of letters on one day and continued them subsequently. Q. Fr. iii. 1 is a signal instance: cf. *Hermathena*, xxvi. (1900), p. 69. This would appear to be a better solution than that of Schiche, who, with Faernus, omits *Delo* in § 1. But the words *Sexto die Delum Athenis venimus* and *in animo nihil festinare nec me movere* compel us to suppose that the first paragraph was written on *terra firma* at Delos.

v. 16. 3.—Itaque incredibilem in modum concursus fiunt ex agris, ex vicis, † ex nominibus (noibus) ex omnibus . . . Iustitia, abstinencia, clementia tui Ciceronis [itaque] opiniones omnium superavit. Appius, ut audivit nos venire, in ultimam provinciam se coniecit Tarsum usque.

I can think of nothing better than the old correction of Victorius adopted by C. F. W. Müller *ex domibus omnibus*, unless we read *ex urbibus omnibus* which is rather far from the MSS. In the next sentence the usual course adopted with *itaque* is to cut it out: others read *Ciceronis : ita*. . . But perhaps it has got transposed, as we saw was the case with *Delo* in 12. 1, and we should begin the next sentence *Itaque*

¹ This word is out of place in the MSS., appearing after *festinare*.

² It is to be regretted that both Schiche (p. 18) and C. F. W. Müller have not adopted this very fine emendation of L. Dindorf, suggested by Archilochus (frag. 64), and have preferred ἀκπαθήρια ὀβρία. The Medicean gives ΑΚΡΑΤΗΡΕΩΝ *iura*.

Appius. "I have been received with unbounded enthusiasm. Accordingly Appius has retired to the furthestmost part of his province, to avoid being witness of this demonstration in my favour."

v. 16. 4.—Nos in castra properabamus quae aberant tridui
(MS. *bidui*).

The reading *tridui*, which is the brilliant alteration of Schiche (Zu Cicero's Briefwechsel während seiner Statthalterschaft von Cilicien, Berlin Progr. 1897, pp. 3-7), is rightly adopted by C. F. W. Müller. Schiche says that 16 was written shortly before 17, as the similarity of the topics show; but probably not on the same day, as we should be led to infer from the MS. reading, which, in both letters, states that the camp was two days' journey off (16. 4: 17. 1). It is unlikely, he justly says, that Cicero would have found two opportunities of despatching letters to Atticus in one day, and in the course of a hurried journey; and almost incredible that, if he had done so, he would have omitted to notice it in the second of the two letters. Again, the corruption might have easily arisen from the similarity of B and R.

v. 17. 3.—Cicerones nostros Deiotarus filius, qui rex ab senatu appellatus est, secum in regnum. Dum in aestivis nos essemus, illum pueris locum esse bellissimum duximus.

There is a strong temptation, as Mr. Tyrrell and I suggested, to insert <*duxit*> after *regnum*. It might have fallen out before *dum*, and owing to the subsequent *duximus*. But ellipse of this verb is found elsewhere: cf. Att. vi. 9. 5 *quo die, ut scribis, Caesar Placentiam legiones quattuor (sc. ducturus erat)*: ix. 10. 3 *male Tarquinius qui Porsennam qui Octavium Mamilium contra patriam*. These passages are quoted by Heidemann (De Cic. in Epp. verborum ellipsis usu, p. 92): but in another passage which he adduces, xiv. 10. 3 *iamne ad centena Cluvianum*, though, perhaps, *perducatur* is to be supplied (cf. xiv. 11. 2 *res ad centena perducitur*), it is possible to suppose no stronger ellipse than that of *sit*: cf. Att. v. 20. 5 *cum haec scribebam in tribunali res erat ad HSCC*.

Att. v. 18. 1.—Parthi Euphraten transierunt . . . cunctis fere copiis. . . . Hostis in Cyrrhastica.

Fam. xv. 1. 2.—A. d. XIII. K. Oct., cum exercitum in Ciliciam ducerem, in finibus Lycaoniae et Cappadociae mihi litterae redditae sunt a Tarcondimoto, . . . Pacorum,

Orodi regis Parthorum filium, cum permagno equitatu Parthico transisse Euphratem et castra posuisse Tybae magnumque tumultum esse in provincia Syria excitatum.

Though, no doubt, in such expressions as *infesto exercitu venire*, it is possible to omit *cum*, still I should prefer to add it here before *cunctis*, where it might easily have fallen out. In the despatch to the Senate (Fam. xv. 1), written two days previously, the account of this event is (§ 1) *Parthos transisse Euphratem cum omnibus fere suis copiis*; cf. § 2 *cum permagno equitatu*. The same despatch says (§ 2) that the Parthians had pitched their camp at Tyba. It cannot possibly be maintained that this Tyba is the town of that name between Thapsacus and Palmyra; it must be located in Cyrrhestica. Now in the account of the capture of Pindenissus (Fam. xv. 4. 11), we read *his erant finitimi pari scelere et audacia Tebarani*, who cannot be the otherwise known Tebarani, who lived in the north of Pontus, bordering on the Euxine, so that we must suppose a Tebarani (or Tibarani as some codices have) with a town Tyba or Tiba (or Tibara) in Cyrrhestica, a district between Mount Amanus and the Euphrates.

Att. v. 18. 1.—Ne quid inter caesa et porrecta, ut aiunt, oneris mihi addatur aut temporis.

See Marquardt, *Staatsverwaltung* iii. 178. The victim was slain in the morning; the *exta* offered in the evening. That was the normal course; but something might happen during the day to prevent the successful completion of the sacrifice. Similarly, Cicero's Governorship was normally of a year's duration, and he is anxious that nothing may intervene to prevent the successful completion of it at the end of the bare year. The saying is accordingly used of an untoward event which intervenes during the progress of an affair, and thus prevents its normal termination.

v. 18. 4.—Sed iam exhibeo pupillum neque defendo.

The word *exhibere* is often used in the Digest for 'producing' in public a person for whom you are responsible: e.g. ii. 4. 17 *cum pro quo quis apud officium cavit exhibere cogitur*; cf. xliii. 29. 3. 8 '*exhibere*' est in publicum producere et videndi tangendique hominis facultatem praeber: proprie autem '*exhibere*' est extra secretum habere. Here Cicero says that he will 'produce' Ariobarzanes, whom he facetiously calls his ward, and let him plead his own case: cf. Dig. xxvi. 7. 1. 2 *Sufficit tutoribus ad plenam defensionem, sive ipsi iudicium suscipiant*

sive pupillus ipsis auctoribus, nec cogendi sunt tutores cavere, ut defensores solent. Licentia igitur erit, utrum malint ipsi suscipere iudicium an pupillum exhibere, ut ipsis auctoribus iudicium suscipiatur: ita tamen ut pro his, qui dari non possunt vel absint, ipsi tutores iudicium suscipiant, pro his autem, qui supra septimum annum aetatis et praesto fuerint, auctoritatem praestent. Cicero makes use of the same allusion in Att. vi. 1. 4 *itaque aut tutela cogito me abdicare aut faenus et impendium recusare.*

v. 20. 2.—Cum dies quinque ad Cybistra Cappadociae castra habuissem.

Editors generally bracket *Cappadociae*. Rather perhaps read *Cappadociae* <castellum> castra. Elsewhere Cicero speaks of it as an *oppidum*, Fam. xv. 2. 2, 5; 4. 4. But the latter is a generic word for a town: and *castellum* means no more than that it was fortified or possessed a military garrison.

v. 20. 8–9.

These paragraphs were added on the 26th Dec., while §§1–7 were written on the 19th (§5). That letters sometimes were written piecemeal is most strikingly shown by Q. Fr. iii 1 (see above page 396). Most commentators indeed read *xv.* for *v.* in §8. But, besides altering the reading of the MSS., this introduces a most unusual order of topics. That Cicero should wait until the eighth paragraph to express his delight at the letters he had received from Atticus, while alluding to them quite casually in §1 (*litteris*) is quite unnatural. This and other similar points have been advanced by Schiche (*op. cit.* p. 24). In favour of the ordinary view that the whole letter was written on the 19th, it is urged by Moll (*De temporibus epp. Tullianarum*, p. 33) that the reference in §8 must be to the meeting on Sept. 29th, at which March 1st was fixed as the day for the debate on the provinces; and that knowledge of this debate is presupposed in §7. Schiche (pp. 21, 22) answers this by showing that March 1st had been provisionally fixed in political circles as a suitable day on which the debate should be held, but was not formally fixed as such until the sitting of Sept. 29. This is undoubtedly true: but in §7 it seems to me that Cicero knew that March 1st was formally fixed upon, that is he knew of the sitting of Sept. 29th. And there is no reason why this should not have been the case. Caelius wrote Fam. viii. 8 (wherein there are copies of the decrees passed on Sept. 29th) early in October. Allow somewhat more than 47 days for the letter to reach

Cicero (cf. 19. 1), and he would have been in receipt of it towards the end of November, certainly before Dec. 19th. He, of course, presumed that Atticus, as being so much nearer Rome, knew all about that debate; hence the tone of his allusion to it in §7. After that letter of Caelius, the next information which Cicero received was from Atticus's letter which arrived Dec. 26, and which had doubtless been despatched early in November before Atticus left Rome for Epirus. This probably related the events of October. Cicero, not having heard for a month about affairs at Rome, naturally spoke of himself as *divi ignorans*.

The separation of these paragraphs from the main body of the letter is due, like so many other good suggestions, to Wesenberg. It has not been received with favour by most critics; but it is adopted by Schiche (pp. 21-24)—who, however, does not seem to notice that Cicero may have learned of the debate of Sept. 29 from the letter of Caelius (viii. 8)—and apparently also by C. F. W. Müller. It is to be observed that §10 is a postscript, possibly written on Dec. 27 just before Philogenes was sent back with the whole of v. 20.

In this letter it is right to call attention to Schiche's (p. 8) admirable addition in §1 of <Colossis> in the space of seven letters left by M between *idem* and *dein*: also to the very learned defence by C. F. W. Müller of Koch's addition in §7: *Sed est totum <in eo> quid . . . sit* (MSS. *est*), which was also conjectured by Boot and Wesenberg. To the latter is due the necessary alteration of *est* to *sit*.

v. 21. 4.—In his γλυκύπικρον illud: confirmas moram mihi nullam fore: deinde addis, si quid secus, te ad me esse venturum.

This is the punctuation of Schütz and Wesenberg, and seems preferable to that of most editors who read γλ. *illud confirmas, moram mihi nullam fore*.

v. 21. 5.—(praeter eum nemo accepit). . . . Praeter eum nemo accepit.

It is quite possible that the words in parenthesis may be a gloss: but somewhat similar repetitions are found: cf. vi. 1. 3. *noe inde satis efficitur in usuram menstruam . . . ea vix in faenus Pompei quod satis sit efficiunt*; vii. 3. 6 *Nunc venio ad privata . . . Ad privata venio*.

The Affair of Scaptius. (Att. v. 21. 10-13: vi. 1. 5-7; 2. 7-9).

Within the last three years three important discussions on this most difficult affair have been published, by C. Bardt (Programm des

Joachimsthalschen Gymnasiums, 1898), Theodor Mommsen (Hermes, 1899, pp. 145–150); and W. Sternkopf (Dortmund Programm 1900). In order to discuss it at all, it will be necessary to make a short statement of the case.

When Cicero landed at Ephesus in July 51 B.C., he was met by a deputation from Salamis in Cyprus, stating that one Scaptius, a money-lender, had obtained a military commission and military forces from the previous Governor, Appius Claudius, and had been using those forces to put pressure on the Salaminians to pay a debt which he stated they owed him. Cicero gave orders that the military forces should leave the island forthwith (*statim*). He acted thus in accordance with a rule which he had determined to adopt, that no money-lender in his province should have the use of soldiers to enforce his claims. The pressure of work connected with the subjugation of the Amani prevented his attending to matters of jurisdiction until December; but in that month the case came before him at Tarsus.

In a private interview with Cicero before the investigation, Scaptius said that the Salaminians thought that they owed him 200 talents, that really they owed him a little less, and asked that Cicero should try to induce them to pay 200. "All right," says Cicero ('*Optime*' inquam).

On taking his seat on the bench, Cicero asked the Salaminians how much they owed. They replied 106 talents. Scaptius loudly protested. "Well, you must make up the accounts," says Cicero. They made the calculation, and it turned out to be 106 to the penny. The Salaminians wished to pay. Scaptius refused, and asked Cicero to postpone the matter: and this to his shame he did, refusing to allow the Salaminians to lodge the money in a temple whereby all interest would cease to accrue.

Why did Cicero act in this way? Because Scaptius thrust a letter into his hands (*impingit mihi epistulam*), showing that he was but an agent, and that the real lender was Marcus Brutus, 'the honourable man'; and Cicero, the 'new man,' had not the moral courage to run counter to the interests of a personage of such ancient nobility and solemn respectability as M. Brutus.

But we must now go back to the earliest stages of the transaction. In 56 B.C. the Salaminians borrowed at 48 per cent. a certain sum from a syndicate of which M. Brutus was the most prominent member. It is almost certain that they soon fell into arrears; and the result was that there were constant 'renewals' of the contract of debt, wherein the interest in default was added to the capital. We hear of a *proxima syngrapha* in Att. vi. 2. 7, which was the last 'renewal,' and was

accordingly the bond on which Cicero had to adjudicate. Now Cicero had declared, in his provisional edict, that he would not enforce the payment of any interest above 12 per cent. per annum compound interest. But in this last 'renewal' the Salaminians had contracted to pay 48 per cent. Cicero could not enforce this contract: as that would be at variance with his published edict, and would mean besides the ruin of the municipality, of which, strangely enough, M. Brutus appears to have been patron. The Salaminians were willing to pay down the sum named in the last renewal with 12 per cent. per annum compound interest. Cicero did not insist that Scaptius should accept this offer. He appears to have simply left the matter unsettled. "The Salaminians wanted to lodge the money; I begged them not to press the matter further. They indeed granted me this favour; but what will become of them if Paullus succeeds me here? And all this I have done for Brutus's sake" (Att. vi. 1. 7.) It must be confessed that Cicero played a poor part in this business, and he felt it.

An important question arises as to the transaction. What was the original amount of the loan? Mommsen's view appears to be this: In 56 B.C. Brutus lent the Salaminians 12 talents at 4 per cent. per month compound interest. This, Mommsen says, was the standing rate of interest (*perpetuum fenus*.) They paid no interest at all, with the result that in about four years, probably after several 'renewals,' the debt had reached close on 85 talents. About twenty-one months before the investigation at Tarsus, they had made the last 'renewal' at the old rate. Scaptius stood upon his bond and demanded nearly 200 talents, to which something over 84 talents at 4 per cent. per month compound interest would amount in 22 months. The Salaminians wanted to pay the bond for 85 at the legalised rate of 12 per cent. per annum compound interest. That came to 106 talents.

The numbers fit most beautifully; and no overpowering difficulty need be felt at the 'hard and unconscionable' bargain that appears to have been thereby struck by Brutus. We must remember that the security was very bad. Quite as ruthless contracts made by money-lenders where the security was also very bad, came to light two years ago before Mr. T. W. Russell's Committee in London. And it must not be supposed that the Roman Government, corrupt as it was, officially countenanced such extortion. Apparently about the very time that this affair was before Cicero at Tarsus the Senate had passed a decree (Att. v. 21, 13) fixing the rate of interest for loans at 1 per cent. per month simple interest,—a clear sign that the extortion of the

Roman capitalists was becoming a danger to the state. The Romans had very strong ideas about business dealings and the obligation of enforcing contracts; and a distinguished Roman capitalist who informed Cicero of this decree gave it as his opinion that a monetary crisis would ensue from such interference with the freedom of contract and such indulgence to debtors, and he referred to the damage done when Caesar, some years before, extended the time of payment of debts. On this theory of Mommsen's we see the meaning of Scaptius's statement that the Salaminians owed close on 200 talents. Nor does the argument really break down because Sternkopf has shown (p. 21) that Mommsen's interpretation of *perpetuum fenus* cannot be sustained. Sternkopf shows conclusively that it would be a contradiction in terms that interest which was renewed¹ (*renovatum*) every month was an 'unchanging' (*perpetuum*) interest. If it be urged that, in Att. vi. 2, 7, *perpetuis* is opposed, not to *renovatis*, but to *quotannis*, and means the standing rate was 4 per cent. per month compound interest, we may remark generally that such a rate of interest could not subsist universally in any settled state of society: and more especially that, in the decree of the Senate alluded to above, it is perfectly plain that a mitigation was granted in favour of debtors, and that the mitigation consisted in just this, that whereas the maximum rate had previously been 12 per cent. per annum compound interest (*centesimis quotannis renovatis*) now it was fixed at 12 per cent. per annum simple interest (*centesimis perpetuo fenore*). Finally Sternkopf shows that in his *Staatsrecht*, III. 1237, note 1, Mommsen himself holds this rational view that *perpetuum fenus* is simple interest. However, this does not appear to me to invalidate the view of Mommsen that Brutus had lent the money at what was virtually 4 per cent. per month compound interest. If the Salaminians, like Ariobarzanes (Att. vi. 1, 3), could not pay up at least the interest in whole or part at the end of each month, it is incredible that such a strict business man as Brutus would not have charged interest for the

¹ The Romans described compound interest as *fenus renovatum quotannis*, or *singulis mensibus*, or whatever the time happened to be. Thus their language would say that 5 per cent. compound interest at the end of the first year was really a revision, or renewal, of the original rate of interest, whereby it became 5½ per cent. on the original sum for the second year; and so on. If the meaning of 'capital,' 'principal,' which *fenus* appears to have in a few passages was a common one, it would be simpler to suppose that *fenus quotannis renovatum* meant that, in compound interest, the *principal* was altered each year. But *fenus*, in the sense of 'capital' or 'principal,' would appear to have a restricted usage.

interest which he was compelled to lie out of each month. Unless there was some penalty for default in the monthly payments, there would be no reason why the Salaminians should not keep their money until execution was put in against them, and invest it otherwise. It is true that Cicero does not anywhere state that the *quaternae* were *cum anatocismo menstruo*; but if the interest was due per month, it was hardly necessary to state that the arrears at the end of each settling day would be added to the capital for the succeeding term. That no addition of interest should be made until the end of each year, and that the legal rate should be 1 per cent. per month was the rule which Cicero published as the one he would enforce; accordingly he always adds *cum anatocismo anniversario*, *cum renovatione quotannis* or the like, the emphatic word being *anniversario* or *quotannis*, and the implied antithesis being *menstruo* or *in singulos menses*, which, as interest was paid per month, was naturally assumed.

But all the same I do not think the original sum lent can be ascertained. It is most unlikely that the Salaminians paid *no* interest at all during the six years. They may have soon fallen into arrears; but that they paid no interest at all from the very first is not in accordance with the probabilities of even extortionate loans. Once you allow a sporadic or partial payment of interest, the amount of which is not given, an additional indeterminate quantity is thereby introduced into the question which precludes the fixing of the original loan with any accuracy.

But I think that there is considerable probability that the original loan, plus the arrears of interest, was the sum which the Salaminians gave their note-of-hand for at the last renewal; and that the sum was 84 talents or thereabouts. Cicero speaks of the 'last note-of-hand,' which would seem to point to others having gone before. It will not be an unreasonable supposition to assume that, at the end of each year of the loan, Scaptius and the Salaminians signed a new note-of-hand, in which the principal and arrears were lumped into one capital sum. The last note-of-hand was probably signed in February 52 B.C., and it guaranteed the payment of 4 per cent. per month compound interest. February was the month for the reception of provincial embassies by the Senate; and it was probably at that time of the year 56 B.C., that the Salaminian envoys were in Rome, and contracted the original loan. In February, 51 B.C., we may suppose there was no 'renewal'; the Salaminians would appear to have refused to renew such a ruinous contract, and as a result, Scaptius got military forces

from Appius, blockaded the Salaminian town council in their City Hall, and pressed his blockade so vigorously that five of the body were starved to death. The Salaminians, however, did not renew the bill; but they were prepared to settle the matter on fair, equitable, and indeed legal terms; and waited for the new governor, who perchance might have some regard for just and fair dealing. They were disappointed; and when even under a Cicero, who was far superior to most of his fellows in uprightness of conduct, and did not care a straw about money, fair and just claims of provincials met with so little support, we can hardly endure to think of what must have been the oppression to which they were subjected by the ordinary rapacious and ruthless pro-consuls.

Now let us assume, that in February, 52 B.C., the Salaminians gave Scaptius a note-of-hand for about 84 talents, at 4 per cent. per month, and from that time forth paid no more instalments of interest at all. In January, 50 B.C., that is 22 months later, the note-of-hand came before Cicero for adjudication. The Salaminians were willing to pay up 106 talents, *i.e.* what 84 would amount to in two years at the rate Cicero prescribed, *viz.*, 12 per cent. per annum compound interest. Scaptius would have his bond paid according to the tenour, that is to say at 4 per cent. per month, compound interest, and $84(1 + \frac{1}{30})^{24} = 84 \times 2.299 = 199$ talents about. Hence he said, "the Salaminians really owe me a little less than 200" (v. 21, 12).

There remain a few points to mention on the language of Cicero's account of the transaction. First, Mommsen shows by a reference to an inscription given in the *Journal of Hellenic Studies*, xii. 175, that the inhabitants of Salamis in Cyprus were called *Salamini*,¹ not *Salaminii*: and the former is what is given in the Medicean MS. of Cicero throughout. His emendation, in v. 21, 10, '*si non (sim MSS.) praeffectus vellet esse syngraphae causa, me curaturum ut exigeret* is possible ('if he would give up the idea of being a commander of military forces, &c.'), but less satisfactory than the vulg. *sin* ('if he only wanted to have a military command for the purpose of the bond, &c.'). The addition of Sternkopf in § 12, VT EX EA SYNGRAPHA CIVS DICERETUR hoc est, ut nec deteriore nec meliore iure ea syngrapha esset quam ceterae sed ut eodem, is practically the same as Boot's, but clearer in sense.

¹ Mommsen, however, did not at first approve of the reference of this inscription to the Salaminians.

paid out or stopped, not money accruing for the use of the capital.¹ That is the natural meaning of *impendium*, and almost the necessary meaning in connexion with *fenus*. In Cicero, Rep. 59 *cum plebes publica calamitate impendiis debilitata deficeret*, the words means 'payments,' 'expenses,' which they had to meet. In Brut. 16 *ut impendiis etiam augere possimus largitatem tui muneris*, the meaning is 'by something additional,' and the reference is to the Hesiodic maxim, *Op. et Diss.* 349 εὐ μὲν μεταίσθαι παρὰ γέροντος, εὐ δ' ἀποδοῦναι αὐτῷ τῇ μέτρῳ καὶ λῶϊον αἱ κε δύνῃαι. In Cicero, pro Quint. 12 *qui ab adulescentulo quaestum sibi instituisset sine impendio, postea quam nescio quid impendit et in commune contulit, medioori quaestu contentus esse non poterat* the words *sine impendio* mean 'without incurring any expense.' With some hesitation I venture to suggest the following emendation of the passage in Varro, which is confessedly 'obscurior' as K. O. Müller says :—*a quo usuras quod in sortem accedebat <impendendo> impendium appellatum; quas quom accederet ad sortem usu, usurae dicta*. The generic word for all that accrues to the creditor other than the bare sum lent is *usura*. The 'expenses,' 'charges,' the money paid over and above the amount due on the footing of interest proper, is *impendium*; the 'interest' proper, which is the money accruing for the use of the loan, is called *usura* in the strict sense. Or perhaps we might cut out the first *usura*.

vi. 1. 5 and vi. 2. 7—

Confeceram ut solverent centesimis sexennii ductis cum renovatione singulorum annorum. At Scaptius quaternas postulabat.

Salaminios . . . adduxi ut totum nomen Scaptio vellent solvere, sed centesimis ductis a *proxima quidem syngrapha* nec perpetuis sed renovatis quotannis. Numerabantur nummi: noluit Scaptius.

It only needs to put these passages side by side to show the contradiction in them. Cicero could only adjudicate on the last 'renewal' of the *syngrapha*; and even the original loan had not been contracted so long as six full years before. We have seen reason (p. 404) to

¹ See "Select Committee on Money-Lending," March 17, 1898 :—

Question 843.—You advanced him £100, and you gave him in cash £75? Advanced him £100; charged him £25; total £100: three months' bill of exchange.

Question 844.—That comes to the same thing: and there were £3 expenses? Shall I refer, and see if that was paid?

Question 845.—Just look: I think you will find it is correct? He paid £3.

suppose that the last 'renewal' took place about February, 52 B.C. Therefore *sexennii* must be wrong. The difficulty is solved by the genius of Sternkopf. He reads *biennii* (= viennii), comparing Livy xlv. 15. 9 *bimensis* for *VI. mensum* (in cod. Vind.); Vell. ii. 31. 3 *biennium* for *sexennium* (in Ed. Princeps et Amerbachii apographon); Livy xxviii. 28. 4 *sex bellium* = *Vibellium*. We may add—Cic. Fam. xv. 4. 8 *sex* for *vi*; Phil. x. 15 *duo* (in cod. Bernensis) for *ii*; and cf. Madvig, Opusc. Acad. 622 (ed. 2).

The Salaminians were ready to pay two years' interest, though the full two years had not run since the last renewal was made.

This is more satisfactory and elegant than Mommsen's addition: *centesimis sexennii <ternis praeterea quadriennii> ductis, &c.*

vi. 1. 7.—Igitur meo decreto soluta res Scaptio statim: quam id rectum sit tu iudicabis: ne ad Catonem quidem provocabo.

Madvig (Adv. Crit. iii. 176) simply alters *statim* to *stat*. This would appear to mean 'by my decree, the money stands paid to Scaptius,' or 'the payment to Scaptius is valid.' But there was no payment, only an offer of payment; a *res solvenda* not a *res soluta*. Further, Cicero did not make a decree for the amount, but postponed the case. But he was perfectly ready to make a decree at once if Scaptius would only consent to take the money: cf. vi. 1. 7 *Illud quidem fatebitur Scaptius me ius dicente sibi omnem pecuniam ex edicto meo auferendi potestatem esse*. But Scaptius did not consent (cf. above, p. 406). I think we should read *Igitur meo decreto soluta res <esset> Scaptio statim*. 'The money might have been paid Scaptius by my decree on the spot: the justice of that, I shall leave to you; I shall not appeal even to Cato.'

vi. 1. 17.—De statua Africani . . . ain tu? Scipio hic Metellus proavum suum nescit censorem non fuisse? Atqui nihil habuit aliud inscriptum nisi *CENS* ea statua quae ad Opis per te posita in excelso est. In illa autem quae est ad Πολυκλέους Herculem inscriptum est *cos*; quam esse eiusdem status, amictus, anulus, imago ipsa declarat. At mehercule ego cum in turma inauratarum equestrium, quas hic Metellus in Capitolis posuit, animadvertissem in Serapionis subscriptione Africani imaginem, erratum fabrilē putavi, nunc video Metelli. Ο ἀνιστορησίαν turpem.'

As the emendation and explanation of this passage, which were

proposed by Mr. Tyrrell in *Hermathena* i. 205ff. and reprinted in "Cicero's Correspondence," III. p. 306, have, as it would seem, been overlooked by critics, and yet appear to be in all essentials correct, it may not be out of place to reproduce them.

In the *De Republica*, according to Macrobius (*in Somn. Scip.* i. 4. 2), Cicero makes Laelius express regret *nullas Nasicas statuas in publico in interfecti tyranni remunerationem locatas*. This was P. Cornelius Scipio Nasica Serapio, who slew Tiberius Gracchus. Now Metellus, great-grandson of Serapio, drew the attention of Atticus to what he conceived to be a mistake of Cicero's, and referred to a statue of (as he supposed) Serapio, which he had placed near the temple of Ops, apparently having got a loan from Atticus to enable him to execute the work (hence *per te*).

Cicero replied that the statue adduced was not one of Serapio, because Serapio had never been Censor. The line of argument which he advances to prove this cannot be understood until we state what emendation of the passage (which confessedly requires emendation) appears most satisfactory. The emendation proposed is to read *cos* for *CENS* (as nearly all commentators do now), and to read *cos CENS* for *cos*.

True, says Cicero, the statue at the temple of Ops has no other inscription but *cos*, and so might have been that of Serapio; but that statue is (as Metellus knows) a mere replica of the statue near the Hercules of Polycles, and this statue has the inscription *cos CENS*, which shows that it represented a man who had been Censor. It, therefore, was not a statue of Serapio, but of Africanus. When I saw the former statue I thought that the non-addition of *CENS* was a blunder of the stone-cutter; but I find that it is Metellus who had made the bad mistake of supposing that Serapio had been Censor.

Mr. Tyrrell supposed that, under the second statue, the inscription was *CENS* only; that accordingly the copyist just transposed *CENS* and *cos*. But it would be unusual, if not unprecedented, to have a elogium with *CENS* only, for virtually all Censors had been Consuls (cf. Mommsen, *Staatsrecht* i. 530); nor do we find any such example in the Elogia in C. I. L., Vol. I. Again, *nihil habuit aliud inscriptum nisi cos ea statua quae ad Opis* would point to a somewhat fuller inscription on the other statue: and a copyist would be more likely to leave out one of two very similar abbreviations than alter what he found. Probably the elogia were simply P. CORNELIVS SCIPIO *cos* and P. CORNELIVS SCIPIO *cos CENS*.

The emendation which is adopted by Boot and C. F. W. Müller was made by Mommsen in C. I. L. I¹, p. 278 (= I², p. 186). He reads *cos* in both places, and alters *autem* into *item*. Mommsen says—"Conturbat scilicet Metellus imagines et subscriptiones ita, ut ad elogium P. Africani maioris (*cos cons*) adiungeret Sarapionis imaginem, ad Sarapionis elogium (*cos*) imaginem Africani." But how does he suppose that it was known that the statue was a statue of Africanus? It must have been for reasons quite extraneous to the elogia; and if that were the case, why did Cicero refer to the elogia at all? Nor can I see any proof that Metellus put a statue of Serapio on an elogium of Africanus. He found a statue standing on an elogium (*cos cons*) which he supposed to be that of Serapio, and had a replica of it made and erected under that supposition.

vi. 1. 21.—Caelius libertum ad me misit et litteras accurate scriptas et de pantheris et ꝑa civitatibus.

That the last clause refers to what Cicero elsewhere calls *vectigal aedilicium* (Q. Fr. i. 1. 26) is certain from what follows. Cicero regrets that it is not generally known at Rome *nullum in mea provincia nummum nisi in aes alienum erogari*. Quintus also refused to exact money for games. Marcus says (*l. c.*) *Et enim, si unus homo nobilis queritur palam te, quod edixeris NE AD LUDOS PECUNIAE DECERNERENTUR, HS CC sibi eripuisse, quanta tandem pecunia ponderetur, si omnium nomine, quicumque Romae ludos facerent, quod erat iam institutum, erogaretur?* I can think of nothing better than the rather desperate expedient of supposing a Greek word lost, and suggest <δο συμβολαῖς> *a civitatibus*. We can suppose *decernendis* omitted, just as the verb is omitted in § 10 *multo enim malo hunc a Pontidia quam illum a Servilia*. If Caelius made any such request, it must have been in one of the lost letters: for no such request appears in his extant correspondence.

vi. 1. 25.—Et heus tu! iamne vos (so Z¹: *genuarios* M.C.) a Caesare per Herodem talenta Attica L extorsistis?

Turnebus (Advers. xxiv. 20) suggested *Genuae* vos, i.e., at Geneva; for *Genua* not *Genava* is the form in which the name of that town occurs in the manuscripts of Caesar, and in the Geographus Ravennas: though it must be confessed that *Genava* is the best attested form: cf. C. I. L. xii. p. 328. This emendation is approved of by Lambinus. Scant justice has been done it in modern times; but it has been powerfully defended by O. E. Schmidt (Rhein. Mus. LV. pp. 395-8).

Without positively assenting to it as correct, it seems to me the best emendation yet proposed and certainly preferable to *iamne vos*: for it explains the corruption of MC better than *iamne vos* does, and Cicero sometimes mentions the place at which an event occurred, even though such mention is quite immaterial: cf. Att. 1. 19. 10 *non dicam quod tibi, ut opinor, Panhormi Lucullus de suis historiis dixerat*, unless, indeed, we should there read *pari modo* (see *Hermathena*, xix. 1893, p. 366).

vi. 2. 3.—Communicavi cum Dionysio. Atque is primo est commotus, deinde, quod de ꝑdeo cum isto Dicaearcho non minus bene existimabat quam tu de C. Vestorio . . . non dubitabat quin ei crederemus.

A few lines before Cicero had said that the passage in Dicaearchus to which he gave credence was *in Trophoniana Chaeronis narratione*, that is to say, in the treatise elsewhere (Att. xiii. 31. 2: 32. 2: 33. 2: Athenaeus 594: 641) spoken of as *περὶ τῆς ἐς Τροφωνίου καταβάσεως*, in which the historical account of Trophonius would appear to have been put into the mouth of Chaeron. This dramatic setting was appropriate, as Chaeronea was quite close to Lebadea, where the cave of Trophonius was, and Chaeron was the eponymous hero of the former town. This Chaeron was the son of Apollo and Thero, daughter of Phylas: cf. Pausanias ix. 40. 3 (5). It is probable, therefore, that we should read for the corrupt words *de Chaerone isto Dicaearcho*.

vi. 2. 5.—Mira erant in civitatibus ipsorum furta Graecorum, quae magistratus sui fecerant. Quaesivi ipse de iis, qui annis decem proximis magistratum gesserant. Aperte fatebantur. Itaque sine ulla ignominia suis ueris pecunias populis rettulerunt.

Suis ueris referre seems a strange phrase, and can hardly be defended by *suis ueris sustinere* in Mil. 25 and elsewhere. Something like 'paying out of their own pockets' is required. Perhaps <ex> or <de> *suis crumenis*. For *ex* omitted cf. § 7 <ex> *ista syngrapha*; and for *de* omitted cf. Att. vi. 7. 1 <de> *nominibus Milonis*. The rare word *crumenis* might readily have been corrupted. It does not appear to occur elsewhere in Cicero, but it is found in Plautus about a dozen times.

vi. 2. 7.—Numerabantur nummi: noluit Scaptius. Tu qui ais Brutum cupere aliquid perdere? "Quaternas habebat in syngrapha." Fieri non poterat.

For *Tu qui* Lambinus reads *Tun' qui*; Boot <ubi> *tu qui*; Tyrrell *Tu*

<quis> qui. (The order in Att. vii. 17. 2 is *Quis autem tu es qui.*) Sternkopf (p. 23) <Heus> tu! *Qui ais Brutum cupere aliquid perdere?* Perhaps more simply *noluit Scaptius; tuque ais Brutum cupere aliquid perdere.* We should, I think, put "Quaternas . . . syngrapha" in inverted commas, as the supposed answer of Atticus, the strict man of business.

vi. 2. 8.—Tu me rogas praefectus ut Scaptius sit? Alias hoc statueramus, ut negotiatorem neminem, idque Bruto probamus.

So the MSS.: but editors mostly alter to *probaramus*. Even so, the statement is not quite satisfactory; for in the other passages (v. 21. 10: vi. 1. 6) there is no mention that Brutus approved of Cicero's determination, rather the contrary in vi. 1. 6 *si praefecturam negotiatori denegatam quereretur*. So that, I think, we must either read *Torquato* for *Bruto*: or better *probabimus* for *probamus*. For many such corruptions of the future into the present, see C. F. W. Müller on Fam. iii. 3. 2.

vi. 2. 9.—Nimis, inquam, in isto Brutum amasti, dulcissime Attice, nos vereor ne parum. Atque haec scripsi ego ad Brutum scripsisse te ad me.

There is no necessity to repeat *nimis* before *inquam*, with Bosius: cf. Q. Fr. iii. 8. 6: Verr. v. 84: also Schmalz, *Antibarbarus*, i. 687; Madvig, *Opusc. Acad.* 351 (ed. 2).

The antithesis in the next sentence would be better marked by reading *Atqui*. 'And yet' (though I do not approve of the position you and Brutus have taken up) 'I have written to him to say how strongly you have advocated his case.'

vi. 3. 5.—Aut Scaptius qui in Cappadocia fuit puto esse satisfactum.

Manutius and most editors omit *Aut*, and read *Scaptio*. Madvig suggested, *Alteri e Scaptiis*. Perhaps, "*At Scaptius, qui in Cappadocia fuit?*" *Puto esse <ei> satisfactum*. The former sentence may be supposed to be a question of Atticus.

vi. 6. 3.—Puero tradere? fratri autem? illud non utile nobis.

Cicero, in the letters of this period, is very fond of using the corrective *autem*, 'do you say' 'quotha': e.g. Att. v. 13. 3 *quid in rep. fiat. Fiat autem?* vi. 2. 1 <*probari*>. *Probari autem?* 2. 8 *quid tandem isti*

mali . . . non fecissent. Non fecissent autem? vii. 1. 4 *rogatus ab ipso. Ab ipso autem* (cf. *Fam.* i. 9. 10). I think the same usage is found here, and that we should read *Puero tradere? an <fratri>? Fratri autem?* The Tornesianus and Cratander read *traderem*; and the *m* may be a remnant of *an*. This use of *autem* is found in Plautus, *Amph.* 901 *inimicos semper oia sum optuerier*. IVP. *Heia autem inimicos*; Pseud. 305 *metuo credere*. PS. *Credere autem?* and Terence *Eun.* 798 *Egone non tangam meam? CH. Tuam autem*.

vi. 7. 1.—*Hortando aut proficies*.

Some addition must be made such as *aut <valebis aut> proficies* (*Brut.* 139: *Phil.* i. 35) or *aut <ages aut> proficies* (*Div. in Caec.* 39).

vi. 7. 2.—*Sed plane volo his magistratibus quorum voluntatem in supplicatione sum expertus*.

Before *volo* I think *<domum>* or *<Romam>* or *<ad urbem>* has dropped out; most probably the latter: cf. *Fam.* ii. 17. 1 (written about a fortnight before), *Rhodum Ciceronum causa puerorum accessurum puto, neque id tamen certum. Ad urbem volo cum primum venire*.

vi. 8. 5.—*Ego nisi Bibulus, qui, dum unus hostis in Syria fuit, pedem porta non plus extulit quam * * domo sua, adniteretur de triumpho, aequo animo essem*.

Schütz proposed to add before *domo* the word *consul* or *olim*: C. F. W. Müller in *consulatu*. Mr. Tyrrell suggested *domi*. This is somewhat cacophonous. Perhaps *modo* 'some time ago.' *Modo* and *domo* are often confused in Plautus (see above p. 394).

XXII.

THE CAHERS OF COUNTY CLARE: THEIR NAMES,
FEATURES, AND BIBLIOGRAPHY. BY THOMAS J.
WESTROPP, M.A.

[Read FEBRUARY 25TH, 1901.]

CLARE occupies so conspicuous a place among the caher-abounding districts of Ireland that I venture to lay before the Royal Irish Academy a list of the names, with short descriptions, and a few notes on the more interesting of those stone forts so exceptionally abundant in that part of the ancient Thomond. The total of forts of all kinds in the county is no less than 2420 (or roughly speaking one fort to 342 acres), the highest proportion among the counties of Munster, and only exceeded by Sligo among the districts of our western coast.

Ancient legend has concerned itself very little with these particular structures. The tale of the sons of Huamore tells how Adhar settled at Magh Adhair, near Quin, where a large mote remains which became the place of inauguration for the Dalcassian Princes of Thomond. Dael settled on the Daelach, and Ennach built a fort (dun) at Tech-n-ennach near him. The present river Daelach runs into the Atlantic near Lehinch; and as we find the large rock-cut fort of Doon on a ridge at its source, we may provisionally suppose it connected with the legend. Irghus settled at Rind Boirne or Ceann Boirne, where the fort named on the maps "Caherdoonfergus" is called by the people Caherdooneerish, and possibly bears the name of the legendary hero. Alestair, according to another section of the Dind Seanchas, dug a rath on mount Callan, but it cannot be now identified. The forts of Cahererochaun, and Lisdundalhen have been connected with the Tuatha de Danann heroes, Crochan and Dal, the latter of whom was the lover of Echtghe "the awful," who gave her name to Slieve Aughty. He was also Sengan's and Gennann's cupbearer.

Two other fort-names, Duntorpa and Caherloughlin, may be derived from Torpa, King of Thomond, 750 (or Torpa, chief of Corcomroe, about the same time), and Lochlain, chief of Corcomroe, 980, while the beautifully situated Grianan of Lachtna, on a grassy shoulder of Craglea, the mountain home of Aoibhell, the banshee and guardian

of the Dalcais, was built by and named from Lachtna (grandfather of Kennedy, the father of Brian Boru) who was prince of Thomond, and won a naval victory and many other battles over the Danes and Norsemen about 840.

Other means of dating the forts are very doubtful, for (including for the moment the neighbouring forts of Galway and Aran) flint implements have been found both in Dun Aenghus and Cahermacnole, called Cahermackirilla, near Carran in Clare. Bronze ornaments have been found in Dun Aenghus, a mould for casting two looped bronze spears in Knockgerranebane Caher in Galway, and I have been told of a bronze socketted celt found in or at a fort in Tulla Upper, Clare. Iron axes have been found in the wall at Caherspeenaun on Lough Corrib, and iron objects in the inner wall of Cahercalla, near Quin, Clare. These, however, prove the date of the cahers as little as the Elizabethan or other coins found in their enclosures; and very probably the caher-building period extends over a vast space of time in our islands, and some of the forts were rebuilt or built down to the eleventh century. For example, a cathair was "built" on Lough Derg by King Conor "na Cathrach" O'Brien, 1070-1120. Kincora, the timber and stones of which had been thrown into the water in 1118, was rebuilt by Dermot O'Brien; and even about 1220-40 King Donough O'Brien built a fort at Clonroad, "a princely palace of earth of a circular form," as stated in the "Wars of Turlough." Some were occupied down to the seventeenth century by well-known families as the O'Davorens in Cahermacnaughten, 1675, and the MacFlanchadha or Clancies of Cahermaclanchy, 1641; while one caher, Balliny, near Black Head, is inhabited to this day, and Caheranardurrish (near Feenagh), Derry-navahagh, and Cahermacnole were inhabited in human memory. The "Wars of Turlough" imply that the forts were going out of use in 1317, as for example "Ruan of the grass-topped Cahers"; and when Donough O'Brien in his great need sent out to muster every available man before the fatal battle near Corcomroe Abbey, he bade his messengers to summon "*even any man in an oolan*" or caher.

Questions as to the age of the present fort-names have so frequently arisen that the oldest record of each name is appended. From the analogy of Aran and other places, I think it is far from improbable that the word 'caher' has replaced, or in some cases been appended to, the word 'dun,' and though my list cannot be as fully and individually

¹ It well deserves this epithet as it has 104 forts, and is the second richest "fort parish" in Clare. The forts are still called "oolans" as in the text.

treated as the lists of cromlechs, churches, and peel towers already published in the Proceedings of this Academy, I hope it may be found at least a step towards a more complete list of the field antiquities of this most interesting county.

The distribution of forts in county Clare is approximately as follows:—

BUNRATTY UPPER.—Clooney, 52; Doora, 50; Inchicronan, 36; Kilraghtis, 63; Quin, 78; Templemaley, 23. Total, 302.

BUNRATTY LOWER.—Bunratty, 9; Clonloghan, 22; Dromline, 15; Feenagh, 12; Kilcorney, 5; Kilfinaghta, 29; Kilfintinan, 5; Killeely, 2; Kilmaleery, 8; Kilmurphy, 12; Kilnasoola, 13; St. Munchin's, 1; St. Patrick's, 3; Tomfinlough, 23. Total, 159.

BURREN.—Abbey, 10; Carran, 67; Dromcreehy, 36; Gleninagh, 6; Kilcorney, 28; Killeany, 15; Killonaghan, 46; Kilmoon, 8; Noughaval, 33; Oughtmama, 11; Rathborney, 46. Total, 306.

CLONDERLAW.—Kilchrist, 10; Kilfiddan, 25; Killadysert, 18; Killimer, 39; Killoffin, 16; Kilmihil, 41; Kilmurphy, 30. Total, 180.

CORCOMROE.—Clooney, 15; Kilfenora, 39; Killaspuglonane, 22; Killilagh, 43; Kilmacreehy, 22; Kilmanaheen, 17; Kilshanny, 22; Kiltoraght, 12. Total, 192.

IBRICKAN.—Kilfarboy, 42; Killard, 34; Kilmurphy, 73. Total, 149.

INCHQUIN.—Dysert, 43; Inagh, 3; Kilkeedy, 28; Kilnaboy, 85; Kilnamona, 21; Rathblamaic, 30; Ruan, 104. Total, 314.

ISLANDS.—Clare Abbey, 26; Clondagad, 39; Dromcliff, 41; Killone, 42; Kilmaley, 71. Total, 219.

MOYARTA.—Kilballyone, 79; Kilfieragh, 55; Kilmacduan, 49; Kilrush, 28; Moyarta, 115. Total, 326.

TULLA UPPER.—Feakle, 10; Iniscaltra, 2; Kilnoe, 44; Moynoe, 1; Tomgraney, 10; Tulla, 43. Total, 110.

TULLA LOWER.—Clonlea, 21; Killaloe, 30; Killokennedy, 19; Kil-luran, 12; Kilseily, 13; Kiltinanlea, 8; O'Brien's Bridge, 30; Ogannelloe, 29. Total, 162.

Total for whole county, 2420.

There are several important groups of cahers, the more remarkable

of which are shown by italics and are given later in this paper. For example we may briefly note—

- (a). THE GLENSLEADE GROUP, Ordnance Survey, Sheet 5, in which we find *Caherberneens*, two forts in Berneens, Gleninshen caher, and four other forts; Garracloon caher and another fort; Lisgogan; *Caheranardurriah* and two forts near it; *Cahernamweela*; *Cahercashlaun*, and two other forts; Poulgorm and Lishagaun, Eantybeg, (2); *Caherlisananima*, *Caherlisaniska*, *Lisananima*; two in Eantymore; six in Cragballyconaal (two of large size with souterrains); Poulbaun and Ballymihil (3). Among these groups occur the two dolmens of Berneens and those of Gleninshen, the beautifully poised dolmen of Poulabrone, the two of Cragballyconaal, the two fallen ones on the borders of the last in Poulbaun and Ballymihil, and the nobly-situated and perfect dolmen of Poulaphuca on the summit of the hill overlooking the Turlough Valley. In all 36 cahers and 9 dolmens. Described in the *Journal R. S. A. I.*, xxviii., p. 359; xxix., p. 370. Only one dolmen, Gleninshen (called Berneens), described by Borlase.
- (b). THE POULCARRAN GROUP, Sheets 9, *Caherconnell*, and a fort near it; two in Eantybeg, *Moheramoylan*, a rath, and another stone fort near it; *Cahergrillaun*, two in Rannagh, *Cahermacnole* and a small fort. Four in Poulcaragharush; seven in the valley of Poulcarran; four on the ridge of Cahermackirilla; three each in Carran and Fanygalvan; four in Sheshy, and two in Moheraroon. Along with these are dolmens in Moheramoylan and Iskancullin, and three in Fanygalvan; three pillars and a tumulus in Cahermackirilla near the last. In all thirty-nine forts and four dolmens, a tumulus, a rath, and three gallans. Described, *R. S. A. I.*, xxviii., p. 350.
- (c). THE NOUGHAVAL GROUP, Sheets 9, 16.—*Caherkyletaan*, and two forts near it; *Cahercuttine*, and a fort near it; *Caherwalsh*, Lismoher; *Cahernaspekee*, and a square fort; three others in Ballyganner, north. *A fort enclosing a dolmen, Caheraneden, Caher with Ballyganner Castle*, and seven other cahers; *Ballykinvarga*, and two other forts; *Caherminane*, and two other forts; two at *Ballyshanny*, and Ballybaun two forts. Along with these, two dolmens and a ring of stones round a souterrain near Cahercuttine; two "slab houses" and two dolmens near Caheraneden; the dolmen in the caher; two other dolmens in Ballyganner south; one at Cloneen and two near Ballykinvarga.

In all thirty-four forts, eight dolmens with cairns, slab huts, and other antiquities. Caherkyletaan, Cahercuttine, Caherwalsh, Cahernaspekee, and its moher, and the great dolmen in Ballyganner South are in line nearly north and south, while the distant hill

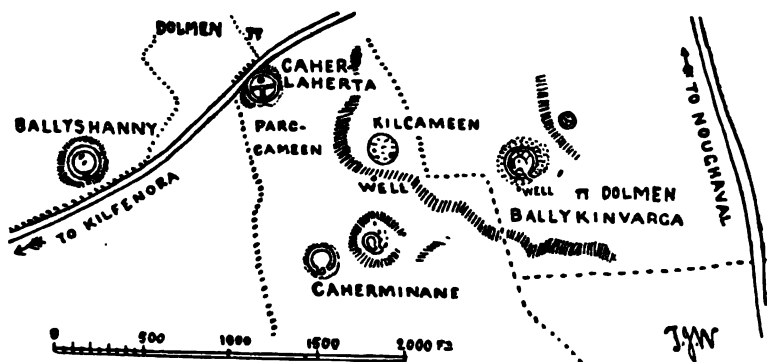


FIG. 1.—Forts at Noughaval.

fort of Doon, Ballykinvarga, the fort near it; Cahernaspekee and the fort on the hill above Caheraneden are in line southwest and north-east, Cahernaspekee lying on the cross lines. *Described*, R. S. A. I., xxvii., p. 116, and xxx., p. 398, and R. I. A. Ser. III., vol. iv., p. 544.

- (d). THE CRUMLIN GROUP, Sheet 4.—Fanore, 2; Ballyelly, 5; *Caher Balliny*, *Caher Craggagh*, and three others, and about thirty forts from Derreen to Oughtdarra. In all forty-two cahers, including *Cahernagree*, *Caherdoon*, *Caherduff*, and *Cahernagrian*. *Description*, R. S. A. I., xxxi., p. 9.
- (e). GLASHA GROUP, Sheet 8.—In Killilagh Parish, *Cahermacrusheen*; *Cahermaclanchy*, and another; seven in Glasha, including *Caherglasa*; Ballyvoe, two, and eight others; two raths at Killilagh *Caheradoon*, near Bealaghaline, Knockastoolery rath, with alleged ogam pillar. The fallen dolmen of Cahermacrusheen lies within this group. In all twenty-one cahers, three raths, a dolmen, and a pillar.
- (f). SLIEVENAGLASHA GROUP, Sheet 10.—In Kilnaboy Parish, Tullycommane, large double-walled caher, and four smaller forts, a rath, Knockaun fort, *Mohernacartan*; *Cahereenmoyle*, *Cahercommann*, and two others; *Cashlaungar*, and another,

Creevagh, two ring-walls, one enclosing dolmen; Carrachaun-taggard (two doubtful enclosures), and a caher in Clooncoose. Besides nine cairns (those of Cappaghkennedy and Teeskagh waterfall being large), and the dolmens at Knockaun fort, Tullycommoun, Slievenaglasha, Cappaghkennedy, and Creevagh, a slab house, &c. In all, seventeen cahers, a rath, nine cairns, and five dolmens. *Described*, R.S.A.I., xxvi., p. 363. Borlase, "Dolmens of Ireland," i., p. 73.

- (g). THE MAGH ADHAIR GROUP, Sheet 34. — *Cahercalla*, and seven forts; Toonagh and four forts, Drumbaun two forts, Creevagh caher, with ten other forts. Along with the mound, cairn and pillar of Magh Adhair, three dolmens in Toonagh, one at Ballyhickey, the southern one at Caherloghan. *Described* (*Cahercalla*, Magh Adhair, and Creevagh), R.S.A.I., xxi., p. 463, xxiii., p. 432, xxvi., p. 150; R.I.A., Ser. III., vol. iv., p. 55.
- (h). THE DANGAN GROUP, Sheet 35, adjoining the last, Carrowbane, and thirty forts (the greatly defaced cahers in Dangan, Cragbwee, and Gorteen), *Caherloghan*, and three forts. Five cists at Moymore in Caherloghan. In all, thirty-five forts and five cists, the latter described in "Dolmens of Ireland," i., p. 92. Nearly all the cahers in this group have been levelled within 4 feet of the ground, and are featureless. And the same applies to a once important series of cahers, south of groups g and h, in Kildrum and Ballymarkahan.
- (i). In numerous other parts of Clare, large groups of earth forts occur, and most of the low hills round Tulla and Bodyke are capped with one or more. The south-west angle of Clare has also large numbers of lisses, some (like the chambered Lisnaleaun at Kilkee, and the fine Liscroneen, with its deep fosse and high earthworks) being very noticeable, but outside the scope of this paper.

[Books referred to briefly:—

"Dunraven," Lord. Notes on Irish Architecture.

D.R.D. "Dublin Registry of Deeds, King's Inns."

R.I.A. "Proceedings of Royal Irish Academy."

"1380." Rentals of O'Brien and Macnamara, Trans. R.I.A., vol. xv.

"B.D." 1641 and 1655. Book of Distribution and Survey (Sir W. Petty).

"R.S.A.I." The Royal Society of Antiquaries of Ireland under its various names as follows:—

Vol. i. 1849. J. Cooke, "Souterrains in Fords of Mortyclough," &c.

Vol. xxii. 1892. T. J. Westropp, "Killaloe: Its Ancient Palaces," &c.

Vol. xxiii. 1893. "Prehistoric Forts of Central Clare."

Vols. xxvi. and xxvii. "Prehistoric Forts of Northern Clare."

Vols. xxviii. and xxix. "Prehistoric Remains in Kilcorney and Carran."

Vol. xxviii. "Forts of Loop Head."

Vol. xxxi. "Prehistoric Remains in North-western Clare."

Dublin University Magazine, xli., p. 505. S. F. "Clare and Aran—Ballykinvarga Fort," &c.

Borlase, W. C., "Dolmens of Ireland."]

"1675." A survey of Clare (1671–1679) now at Edenvale.

CAHER NAMES.

[Existing names in small capitals, lost names in italics.]

BURREN.

GLENINAGH (6 forts).

1. CAHERDOONKEERISH or *Caherdoonfergus* on map (O. S. Map 1). On Black Head, an irregular ring with one angle, and many traces of coarse rebuilding. It is terraced; gateway defaced, to east, 34 inches wide, name probably means "Fort of Irghus." Described by Lord Dunraven, "Notes," vol. i., p. 17. Limerick Field Club Journal, 1900, T. J. Westropp. R.S.A.I., vol. xxxi. (1901), p. 4. *Same*.
2. CAHERDOONTEIGUSHA (1).—A defaced ring wall.

DROMCREEHY (36 forts).

3. CAHERLOUGHLIN (2).—A large ring wall divided into fields, and defaced.
4. CAHERMORE BALLYCONRY (2).—"Baile conaire," 1380. A large irregular fort, defaced.
5. CAHERWARRAGA (5).—Defaced.
6. CAHERMOYLE (5).—In Dangan, with two souterrains and a gateway, probably Cahernague, 1641, and Kahernagree in Dangan, 1655.
7. CAHER of OoANKENOCKNAGROACH (5).—Nearly levelled.
8. CAHERNAHOON (2).—Ballycahill. A dolmen once stood in same townland.

ABBAY (10 forts).

9. CAHERMORTYCLOGH (3).—It and the noteworthy earthen Liss of Mortyclough, with two ranges of souterrains, lie together. O'Curry suggests that the name is "mothair tighe cloice." R.S.A.I., vol. i. (1849), T. Cooke, vol. xxv. (1895), p. 284.
10. *Caheridon*, north of Corcomroe Abbey, 1580. Elizabethan Map, in Hardiman Maps, Trinity College, Dublin, perhaps last.

KILLONAGHAN (46 forts).

11. CAHERDUFF (4), in Crumlin.—A ring wall, not named on 1839 map.
12. CAHER (1). *Same*.—Cathrach Lisnahaba, 1380, Cahera Lissyniagh. Inquisition of Donough, Earl of Thomond, 1624. Properly "Caheragh." *Described*, R.S.A.I., xxxi., p. 8.
13. CAHERS OF BALLYELLY (4).—Five small stone forts. *Described*, R.S.A.I., xxxi. p. 10.
14. CAHERBALLINY (4).—Balliny, 1641. A large ring wall, 138 feet across, of fine masonry, 5 to 8 feet thick, and 10 feet high. The gate faces the east. It is still inhabited. *Described by* Lord Dunraven, vol. i., p. 18, and R.S.A.I., xxxi., p. 9, with illustration.
15. CAHERBANNAGH (2).—Grant, 1612. A defaced fort.
16. CAHERNAGREE (4).—Defaced by a road cut through it. Perhaps "Cahernagree," of 1668, grant to Murrough, Earl of Inchiquin.
17. CAHERANARDURRISH (5). A coarsely built ring wall 114 feet in diameter and 9 feet high and thick. Much of the wall standing. It was inhabited in 1839. The name is said to mean the Caher of the high wood, Ardross (in contrast to Feenagh at the foot of the hill) so Ordnance Survey Letters. *Description* R.S.A.I., xxxi.

KILMOON (8 forts).

18. CAHERMOYLE, Cragreagh (4). A ring wall of large and good masonry, 6 feet high, defaced, gateway to N.E. *Description* R.S.A.I., xxxi.
19. CAHERCLOGGAUN (4). A large ring wall 119 feet in diameter with remains of O'Loughlin's Castle. Masonry of very unusual character with frequent unbroken joints. Cahercloghan, 1550 granted, and Kaercloghan, 1560, map. *Description and illustrations*, R.S.A.I., xxxi., p. 12.
20. CAHERMOYLE or Caherbullog (5). The two Cahirebollocks, 1583 grant. Caherbologe, Inqn., 1624. A well-built ring wall 98 to 96 feet in diameter. Where the outer wall has fallen, an inner wall appears. *Description* R.S.A.I., xxxi., p. 15.

21. CAHERBULLOG (4), the upper fort now usually bears the townland name. It is a coarsely built, featureless ring wall, 100 feet in diameter, 11 feet thick, and 7 high. Foundations of huts and perhaps kennels remain. *Described*, R.S.A.I., xxxi., p. 16.
22. *Cahirelany*, near Caherbollogh. D.R.D., 1710, Book 9, p. 35.
23. CAHERBARNAGH (8). A levelled fort. "Caherwarnagh," in grant to Boetius Clanchy, 1621.
24. CAHERPOLLA at Lismoran, 1545 grant. Caherpally. Inquisition 1624, "in Kilmoone" Act of Settlement, grant 1666. Perhaps Lismorahaun Caher, a well-built rectangular fort.

RATHBORNEY (46 forts).

25. CAHERFEENAGH (2). "Fiodnaig," 1380. A fine oval fort, 152 feet across north and south, and 114 feet east and west, with three terraces and two flights of steps. The wall is 13 to 15 feet high, and 17 feet 4 inches thick. The gateway is defaced, and looks to east. The masonry shows many signs of rebuilding, the wall is double, and the batter 1 in 12. *Described*, R.S.A.I., xxxi.
26. CAHERLISMACSHEEDY (5). A coarsely-built crescent wall 10 feet high, and 12 feet to 18 feet thick abutting on a cliff, enclosing a D-shaped space 171 feet by 147 feet, with a hut site.
27. CAHER CLOONMARTIN (5).
28. CAHERMACUN (5). Caherigone, 1603 grant; Kahirmahunne, 1655, B. D., p. 470.
29. CAHERBERNEENS (5). A small nearly levelled fort 50 feet long.
30. CAHERGARRYCLOON (5). A ring wall.
31. CAHERMACNAUGHTEN (9). A massive ring wall 127 feet diameter, the rampart 10 feet high and thick, with late mediæval gateway to east-south-east, and foundations of houses. "Caherwicknaghty, 1590 Fiants." This caher and its contained buildings are fully described in the will of Gillananaeve O'Davoren, 1675. In this caher Donald O'Davoren wrote his dictionary of Irish words, and Duaid Mac Firbis studied Brehon Law. *Described*, R.S.A.I., xxvii., p. 120, with plan.
32. CAHERYTHOOLAGHA (9). Not named on 1839 map. Caher Idula in Inquisition, 1624. Caherwooly, 1641. Caherigoola, 1675. Cahirahoula, or Caheridoula, D. R. D. Book 9, p. 285; 94, p. 28.

33. CAHERMORE, Ballyallaban (5). A fine ring wall 186 feet diameter, of large "cyclopean masonry," 9 feet high and thick, with a late mediæval door to north-east, overlooking all the Ballyvaughan Valley to Galway Bay. Foundations of house, huts and enclosures lie in the garth. *Described* by Lord Dunraven, I., p. 18, R. S. A. I., xxxi.
34. *Kaheriskobohell* and *Kahirballyungane*, near Caherwooly, 1655, B.D., p. 475, probably Doonyvardan forts.

KILLEANY (15 forts).

35. CAHERMAAN (9). Cathair medain, 1380; Karmyn, 1560 map; Carneane, Inquisition, 1624.
36. CAHERMACKERILLA, or *Caherlappane* (9). Cathair lapain, 1380; Caherlaffane Inquisition, 1624; Carrowmickerill or Caherlappane, 1602 grant; Cahervickerelly and Ballylappan, Inquisition of Terence O'Brien, 1624. The fort is much broken, and contains a well dedicated to St. Colman mac Duach.
37. "*Cahernateinna*" (5). The site to which this name is attached by the maps is only a sheepfold with no fort or foundation near it.

KILCORNEY (28 forts).

38. CAHERNARDURRISH (5). "Fort of the high door." A ring wall, 126 to 132 feet in diameter; the wall 8 feet high and thick, of good coursed masonry; had cairn and small cist in interior; gateway perfect; faces east. *Described* (with view) in R.S.A.I., xxix., p. 379.
39. CAHERNAMWEELA (5). Locally "*Cahernane bwee*." A small ring 60 feet in diameter, with hut-site and enclosure on a bluff over the valley in Poulgorm; gateway to south-east. *Described*, R. S. A. I., xxix., p. 378.
40. CAHERCASHLAUN (9). A remarkable cliff fort of irregular plan, 152 feet long, on a high knoll with an enclosure down the eastern slope and gateways to east. In the upper garth is a large rock-cut souterrain. *Described*, R.S.A.I., with plans and view, xxix., pp. 376-378.
41. CAHERLISANANIMA (9). Lisananamagh, 1655, B.D., p. 468. A ring wall on a bluff in Eanty. The name is sometimes applied to another fort with a perfect gateway, on the hill side to the north. *Described*, R.S.A.I., xxix., with view, p. 371.

42. CAHERLISANISKA (9), on another bluff opposite the last.
43. CAHERCONNELL (9). A massive ring wall 140 feet across, 14 feet high, and 12 feet thick. A defaced gateway with side posts, faces the east. "Caherconnell" Inquisition, 1624. "Karcconnell," 1655. *Described*, R.S.A.I., xxix., p. 374, with plan.
44. CAHERLISSANBOUM (9). A well-built ring wall, with a side enclosure on the edge of a cliff.

CARRAN (67 forts).

45. CAHERGRILLAUN (9), said to mean "fort of the heath bloom," translated "Dutch chair" in Mason's "Parochial Survey," vol. III., p. 287. A fine oval ring wall, 120 by 150 feet. The wall is 15 to 9 feet high, and 10 feet thick at base, to 6 feet 7 inches above, with terraces, and a double flight of steps meeting at a platform, like Staigue and Cahergel in Kerry. The gateway faces the south, and is defaced masonry, "cyclopean," with ruder coursed masonry above. *Described*, R.S.A.I., xxix., p. 364, with plan and view.
46. CAHERMACNOLLE, or CAHERMACROLE, called Cahermackirilla on 1839 map (9). Cathair meic iruil, 1380; Cahermacknoulle, Inquisition of Morogh O'Cashyn, 1623; Cahermaconnella, Inquisition, 1624; Cahermacconnello, Mason's Survey, 1819.¹ A large circular ring of fine masonry, with a side enclosure. The ring is 140 feet across the walls, 8 feet high and 15 feet thick. In it are a souterrain and foundations. The gateway defaced and to the east. Flint implements (pointed) were found, and base silver coins. *Described*, R.S.A.I., xxviii., with plan.
47. CAHER MOHERAMOYLAN (9), circular but nearly levelled, except a perfect gateway to the south, 4 feet 4 inches wide and 6 feet high. A souterrain and foundations lie in the garth. *Described*, R.S.A.I., xxvi., with view, p. 365.
48. CAHER OF POULCARAGHARUSH (9). A massively-built ring, with a perfect gateway facing the east. *Described*, R.S.A.I., xxviii., p. 361, with view.
49. CAHER MOHERNACARTAN, also called "Cahernaglasha" (10), not named on 1839 map, lies on the border of Kilnaboy parish. It is a massive caher, 138 feet across, overlooking the "Labbanaglasha" valley. It had a souterrain and hut foundations,

¹ Caher M^o Noill. Estate maps of Earl of Thomond, 1703.

and is the traditional residence of the smith Lon Mac Liomhtha of the Tuatha de Danann. *Described*, R.S.A.I., xxvi., p. 364, Legend, xxv., p. 227.

50. *Cathair Crallaha*, south of Crughwill and between it and Leanna, mentioned, 1317, in the "Wars of Turlough."

NOUGHAVALL (33 forts).

51. CAHERKYLETAAN (9). A square fort of large, good masonry, 105 by 170 feet. "Cahermare," "Carrowmare, *alias* Keiltarne," 1712, D.R.D., book 9, p. 285. *Described*, R.S.A.I., xxvii., p. 117.
52. CAHERCUTTINE (9), not named on 1839 map. A fine and massive oval ring wall, 130 by 137 feet, with a slight terrace and three flights of steps. The gate to south perfect, save for lintel, which was removed since 1876; near the fort are two dolmens, a cairn, and a small slab ring with souterrain. "Cahirnegotten, or Cariowen Chotten, *alias* Cahergotten," in Patent to Earl of Thomond, 1610. *Described*, R.S.A.I., xxvii., p. 117, with plan and views; Proc. R.I.A., ser. iii., vol. iv., p. 544.
53. CAHERANEDEN (9), Caracaden, in Ballyganner, 1655, B.D., p. 460. A well-built but defaced ring wall; on a low ridge near it are two dolmens, a slab hut and cairns, and a rock-cut roadway. *Described*, R.S.A.I., xxvii., p. 119, with view; Proc. R.I.A., ser. iii., vol. iv., p. 545.
54. *Caherpolla*, *alias* *Fahaffane*, adjoined Lismoher in 1655. Inquisition, 1624.
55. CAHERWALSH (9), perhaps the last named. It is a large straight-sided enclosure, 162 by 156 feet, with many foundations; near it are a cairn and hut-sites. *Described*, R.S.A.I., xxvii., p. 118, with plan.
56. CAHERNASPEKEE (9). A ring wall, with a terrace faced with slabs and defaced gateway to south. *Described*, *ibid.*, p. 118.
57. CAHERACLARIG (9), in Sheshy; defaced.
58. CAHERMORE SHESHY (9), defaced.
59. CAHER BALLYGANNER (9). A large well-built caher, enclosing foundations and late castle of O'Conors. A large dolmen on the hillside above it (figured by W. Borlase, "Dolmens of Ireland," i., p. 67). *Described*, R.S.A.I., xxvii., pp. 121, 122, with plan.
60. CAHERS OF BALLYGANNER NORTH: one contains a dolmen, the other has a perfect gateway and encloses a small ring-wall.

CORCOMROE.

KILLILAGH (43 forts).

61. CAHERNAGRIAN (4), in Ballynahown.
62. CAHERADOON (4). A ring wall on the ridge in Ballinahown (over Crumlin) in Killonaghan. These two forts are not named on 1839 map.
63. CAHERADOON (8), Doonmacfelim, defaced.
64. CAHERADOON (8), Doonagore, levelled.
65. CAHERMACCRUSHEEN (8), defaced. Cahirem^ccrosseyne, 1655, B.D., p. 258. Cahircrusseen, 1719, D. R. D., Book 24, p. 320.
66. CAHERMACLANCY (8). A ring wall of large blocks, 110 feet across, nearly levelled to foundations. It had a souterrain, and is near a dolmen. Cahermaclanchy, 1585 and 1621, grants to Boetius Clancy.
67. CAHERGLASHA (8), Glaise, 1380. A nearly levelled small fort, 87 feet across, with a large souterrain and cells.
68. CAHERKINALLIA, *Cahercunella*, or *Caherreagh* (8). A ring wall on a low knoll in a marshy hollow. Caherkinnalia, 1655.
69. *Cahergalline*, 1621, grant to Boetius Clanchy; Cahergallyre, 1579, grant; also B.D. (1655), p. 255, adjoining Killilagh townland; or Cahergaltech in Kilylogh, 1709, D. R. D., Book 1., p. 425.
70. *Cahirgunine*, probably in Teergoneen, D. R. D., Book 24, p. 320.
71. *Caherkelly*, *alias* Carkelly, or Carhnekeill, near Doonmacphelim, named with Cahergalline, 1708, D.R.D., Book 1., p. 425, Book 24, p. 320.
72. *Cahermannagh*, or *Cahiremanagh*, 1719, in Killilagh, D.R.D., Book 24, p. 320.

KILMACREEHY (22 forts).

73. CAHERMORE (14). A bridge near Moher Cliff fort, perhaps Caher Moher; the neighbouring fort consisted of a dry stone wall across a spur on Hag's Head; it is now levelled.
74. CAHERGILLAUN (8). A small fort in Lislorkan.
75. CAHERNAFUREESHA (22). A half-moon wall abutting on a cliff, now defaced.
76. CAHERICAHILL (14), so named in 1626 Inquisition; destroyed.
77. CAHERBARNAGH (14).

KILLASPUGLOWANE (22 forts).

78. CAHERADERRY (15), "Caheridarum in epātu Fenabor," in charter of King Donald O'Brien to Forgy (Clare) Abbey, 1189. "Cathair in doire," 1380.

KILSHANNY (22 forts).

79. CAHERPHREGAUN (15). A small caher east of Kilshanny church.
 80. CAHERLOOSCAUN (15), 1641; "Cahireluscan," 1712, D.R.D., Book 9, p. 35.
 81. CAHERYCOOSAUN (15), 1641; "Cahirecoosan," 1712, Registry of Deeds, book 9, p. 35.
 82. CAHEREAMORE (15), Cagherimore, 1655, B.D., p. 230; D.R.D., pp. 36, 86.
 83. *Carfartagh* and *Chagherlane*, in Cahereamore. B.D., 1655, p. 230.
 85. *Caherveylane*, near Cahireluscan, or Caherlooscaun, D.R.D., 1712, Book 9, p. 35.

KILFENORA (39 forts).

86. *Cathair Fhionnabhraich*, a fort near Kilfenora, named in the "Book of Rights."
 87. CAHER BALLYKINVARGA (9), Baile cind mhargaid, 1380, probably the fort "Caherloglin," in East Ballakenuarga, 1655, B.D., p. 189. A very fine and massive ring wall (B), 135 by 155 feet; diameter, 14 feet thick and 15 feet high, with three terraces and upright joints, of large masonry. A massive gateway to east lintel, 7 feet long. The fort is surrounded by a thick-set abattis of large and small pillars, 50 to 100 feet out, with kerbing of large stones; one pillar is 7 feet high and 2 feet 7 inches thick (E). There is a well (F) in the abattis and a straight, sunken passage (D) leading to the gateway. Foundations of enclosures inside (A). A fallen cromlech lies in the neighbouring field. *Described*, R.S.A.I., vol. XXVII., p. 121. It is very slightly and imperfectly noted by Lord Dunraven, II., p. 18, who omits all allusion to the abattis, monoliths, and hut-sites, and says wrongly that the wall is double and the passage curved; and is briefly mentioned by Mr. Frost, *History of Clare*, p. 101, and by "S. F.," *Dublin University Magazine*, xli., p. 505.

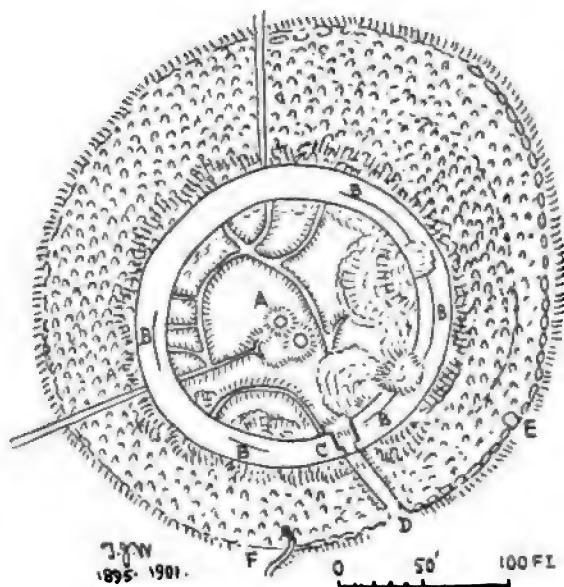


FIG. 2.—Ballykinvarga.

88. CAHERMINANE (9), "Cathair mionain," 1577, *Annals of the Four Masters*; "Carmanbeg," 1655, B.D., p. 191. A fairly perfect ring wall, with steps and defaced gateway to east; the gate had four corner-posts and two lintels.
89. CAHERLAHERTAGH (9), Carroghflaherty in Caherminane, grant 1585. A greatly defaced fort, with large "cyclopean" masonry, an oval hut-site, &c.; not far away is a dolmen, figured by Borlase, vol I., p. 69. *Described*, R.S.A.I. xxvii., p. 125.
90. CAHER BALLYSHANNY (9). A large defaced ring, 132 by 137 feet diameter, on a knoll. It had a gate to the east, and steps leading down from it, and traces of souterrains. *Ibid*, p. 126.
91. CAHEREMON (16), Caheredmond, in Ballykeady (Ballykeale), 1655. Now levelled to the field. Dutton in his *Statistical Survey*, Appendix, p. 12, 1819, describes its walls as covered with orpine, and names it Cahiromond. Petrie calls it "a fine remain."¹

¹ "Military Architecture of Ireland," MSS. R.I.A.

92. CAHERBALLAGH (16), so called from the townland.
 93. *Caheryline*, in West Ballykenuarga (perhaps No. 88), 1655, B.D., p. 119.
 94. *Caherballaghan*, in Ballykeady West. *Ibid*, p. 193.
 95. LISDERREEN NA CAHERAGH (24), an earthen fort.

CLOONEY (15 forts).

96. CAHERSHERKIN (15), Cathair Seircin, 1380, Cahersherkin, 1655. Kiltoraght Parish has 12, and Kilmanaheen 17 forts. So far as I can find, no caher names occur.

INCHIQUIN.

KILNABOY (85 forts).

97. CAHERCOMMANE (10), not named in 1839 map; Kahirekamon, Fiant, 1585 (xv. Annual Report of Deputy Keeper), Cahircomaine (in Tullycomaine), B.D., p. 520, 1655. (The townland

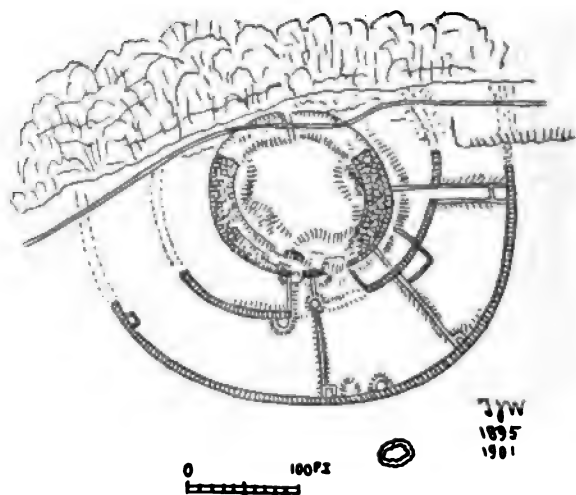


FIG. 3.—Cahercommaun.

is Tullach Chumann, in *Annals Four Masters*, 1599.) It is a noble triple fort on the edge of a precipice over Glencurraun Valley. Perhaps the fort of Caechan Boirne in the *Book of Rights*, "constant the road of the King," as the "Boher na

mac Riogh " runs to the foot of the hills. The middle fort is a massive ring, 130 by 157 feet in diameter, with no apparent gateway, except an opening 3 feet wide on the edge of the cliff. The rampart is rudely built, 21 feet thick, with a terrace and steps, and 14 feet high. The second wall is of better masonry, but much broken, the outer wall coarsely built with upright joints, and 8 feet high, 320 by 245 feet across, several radiating walls (two forming a curious passage), and hut foundations remain. *Described*, Dunraven, i., p. 18, and R.S.A.I., xxvi., p. 153, with plan and views.

98. CAHEREENMOYLE (10), a fort of beautifully regular masonry on a knoll opposite the last.
99. CAHER; CASHLAUN GAR (10), not named on 1839 map. An interesting cliff fort on an abrupt rock. Its wall is well built, 10 feet thick, and 13 feet 6 inches high, with upright joints and a well-built gateway facing east-north-east, and over a cliff, so must have been reached by ladders; the wall has several salient angles as it follows the edge of the precipice. Several oval hut sites are traceable in the interior. *Described*, Dunraven, i., p. 18.; R.S.A.I., xxvi., p. 152, with plan and views.
100. CAHERSAVAUN (10), a ring wall on the border of Carran, usually forming an islet in Castletown Lake. *Described*, with view, R.S.A.I., xxvi., p. 364.
101. CAHERSCREBBEN (16), not named on 1839 map. A large ring wall, 120 by 135 feet on the ridge behind Lemeneagh Castle. It has traces of enclosures, and two souterrains; the present rampart is built against an older one. *Described*, R.S.A.I., xxvi., p. 368.
102. CAHERFADDA (16), so named in 1641; "Cahiradda," grant to Murrough, Earl of Inchiquin, 1666, defaced.
103. CAHERMACON (16), Cahermachuna, 1655, B.D., p. 508.
104. CAHERBLONICK (16), Caherblonghe, 1544, in grant to Murrough, 1st Earl of Thomond. Caherblonogg, 1675.
105. CAHERMORE ROUGHAN (16), a large fort, with a souterrain and narrow gateway to east; near it was found a cist, with two skeletons not extended, but with their feet to the east. In the same field is the Tau cross of the Termon of Kilnaboy, and not far distant a fallen dolmen. *Descriptions*, Canon Dwyer, "Diocese of Killaloe," p. 494; R.S.A.I., xxvi., p. 367.

106. CAHERMORE LACKAREAGH in Glenquin (10), "Cahirmore in Gleankeane," 1655, B.D., p. 519. A well-built ring wall, with outer circle on a bluff above Glenquin, but under the cliffs of Slievenaglasha. The inner ring 110 feet in diameter, the outer ring, 170 feet across. The gateway is broken, and faced the south-east. The wall is 10 feet thick, and $11\frac{1}{2}$ feet high, and has a terrace. A souterrain remains in the garth. *Described*, R.S.A.I., xxvi., p. 365, view, xxvii., p. 122, plan.
107. CAHERMORE KILLEEN (17), "Caherdrumassan or Cahragheeduva" in Killeen, 1655, B.D., p. 515, a large ring wall with a terrace, but otherwise featureless. The gateway faces the east.
108. CAHER, MULLACH DABRIEN (17), a well-built and massive caher, 129 feet to 131 feet in diameter, with a terrace and recesses, probably for wooden ladders. A rock, cutting perhaps a souterrain, remains. The wall is 9 feet thick and 9 feet high; batter, 1 in 4. *Described*, R.S.A.I., xxvi., p. 367.
109. CAHERAHOAGH (17), a coarsely built fort, 95 feet to 103 feet in diameter; the sides flattened, and corners boldly rounded off, with late mortar-built gate and steps to east. Early steps to north, straight from the ground to the terrace, and turning to the left from terrace to top of wall, R.S.A.I., xxvi., p. 367, with view, p. 366.
110. CAHERBULLAUN (17), Caherinvullaun, near Lisduff, 1587, Fiant, Carvallaun, 1655.
111. CAHERMACATEER (16), Caherwickyster, 1601 fiant; Caher Mac Teire, 1666 grant. It is coarsely built of large rough rocks and is featureless.
112. *Cahrietellaghan*, near Ballycasin and Kilnaboy, 1621.
113. *Cahernahallia*, 1544; or Cahernacally, near Glenkeene, 1660; or *Cahernahaille Oghternagh*, 1655, B.D., p. 510. Perhaps *Caherwoughtereen* or *Caherogherlinny* in Glankeen, 1655, near Lackareagh, and, if so, possibly Cahermore Lackareagh, or the defaced caher in Parknahailly in Caherblonick.
114. *Cahershillagh*, named separately from the last, and perhaps identified (B.D., p. 510) with Caherveanagh (Caherbannagh), 1655.

115. *Cahermoyls* or *Cahermeenros* on map, 1651, apparently at or near Roughan; or *Cahirmeene*, 1666, grant; perhaps *Cahermore*, Roughan. *Cahermore* adjoins *Lemaneagh*, 1675.
116. *Caherpolla*, near *Cahernahally*, 1655; and (117) *Caherluny* near it, *Inquisition*, 1605.

RUAN (104 forts).

118. CAHERLOUGH (17), *Caherloghey*, 1592 Fiant, perhaps *Cahirloga* in *Dysert D.R.D.*, Book vi., p. 435.
119. CAHERMACREA (17), *Kahirm'knea*, 1592 Fiant. *Cahervicknea*, 1655, B.D., p. 566. There is a massive ring-wall, 130 feet across, and in parts 8 feet high. The features defaced, and much of the wall facing re-built to enclose a plantation. Near it, and entirely overthrown and overgrown is a large oval enclosure 300 feet across.
120. CAHERNAVILLARE and CAHEREEN (17) in *Caherlough*, small overthrown cahers.
122. *Cahernamart*, alias *Carhuanalasha* in *Tullydea*, 1641. A large earthen fort, still called *Liscarhoonaglasha*.
123. CAHERNANOORANE (25), *Cahernenioreane* in *Ballymacrogan*, B.D., p. 557, not named in 1839 map. A caher of large masonry, much broken.
124. *Caher Tirenavoghter* (17), 1655, B.D., p. 567, one of the cahers in *Teernea*.
125. *Cahergar*, 1641. Perhaps near *Lough Gar*. In *Dysert* in 1675 survey.
126. *Cahergal*, near *Lismuing*; grant 1671.
127. *Cahermigan*, in *Ruan*, 1641.
128. *Cahirballykany*, 1655, B.D., p. 564, in *Bealickania* (17).

RATHBLAMAIC (30 forts).

129. CAHERGALL HILL (16), *Carhuduff*, or *Cahergeale*, or *Knockardinees*, 1655, B.D.
130. CAHERNAMONA (25), so named, 1641.
131. CAHERCORCAUN (25), so named in 1577 Fiant, but *Cragcorcraun* in *Annals Four Masters*, 1584 and 1601.
132. *Cahirnemohr*, *Cahergreenane*, 1655, B.D., p. 526, or *Cragmoher* (25) alias *Drominglas*. "The stone fort of *Drominglas*," as named in the *Inquisition* of *Donald O'Brien*, of *Inishtymon*, 1588.

DYSERTODRA (43 forts).

133. CAHERAGALEAGH AND CAHERGURRAUN (25).—Two nearly levelled double-ringed cahers on the ridge of Cappanakilla; the latter is probably the Cahergirdone of 1550.
135. CAHERCLANCY (25), so called, 1641. Caherflanchy or Gortnepish, 1655, B.D., p. 554.

KILNAMONA (21 forts).

136. CAHERMACGORMAN (25).—Cathair Maicgormain, 1562, *Annals Four Masters*. Cahervicornan in a grant, 1603. Nearly levelled.
137. CAHERVICKAUN (25).
138. CAHERBANNAGH (25), in Carrowkelle, 1655, B.D., p. 573; probably in Dysert Parish, 1612; Caherbeanagh leased by the Earl of Thomond, 1666.
- There are twenty-eight forts in Kilkeedy and three in Inagh parish, but so far as I know there are no caher names.

IBRICKAN.

KILFARBOY (42 forts).

139. CAHEROGAN (31).—Caherogan in grant of 1550.

KILMURRY (73 forts).

140. CAHERRUSH (30).—"Cathair ruis," *Annals Four Masters*, 1574. Carrush, 1655, B.D., p. 424. Entirely destroyed.
141. CAHWRARD (31) in Doonsallagh.
142. CAHERARAN (31).
143. *Caghryariff*, a mile and a-half to N. of Annagh House, 1803. Fleming's "Post Chaise Companion," p. 203.

KILLARD (34 forts).

144. CAHERLEANE (46).—Cahirleague, 1655, map.
145. *Caherduff and Cahermoyle* (46), in Glascoon, named in 1623 grant.

MOYARTA.

KILBALLYONE (79 forts).

147. CAHERCROCHAUN (71).—Cahercrocane, named with Dunlecky in a grant of 1511. A large demolished fort, 180 feet in diameter, on a hill commanding a view from Arran to Mount Brandon and up the Shannon to Tarbert.
148. *Caheracoolia*, *Cahersaul*, and *Cahernaheanmna* (71), three nearly levelled forts on Loop Head (Cuchullin's Leap), their legend (and notes on the sites) given, R.S.A.I., xxviii., p. 411.

KILMACDUAN (49 forts).

151. CAHERFEENICK (47), named in 1641 and 1655, B.D.
152. *Cagheragheullin* (48), named in 1655, B.D.
153. *Cahernoroughtis*, in Dromelihy, named in 1655, B.D., p. 373.

MOYARTA (115 forts).

154. *Cahercuttine*, or Carriowenchotten, in Termonshenan Inquisition, 1610. *Gaherncottine*, 1590 (Fiant).

KILRUSH (28 forts).

155. *Cahernaholey*.—1641 Depositions in Trinity College, Dublin; held then by F. Moseley.
Fifty-five forts, but no caher names in Kilfieragh.

CLONDERLAW.

KILLIMER (39 forts).

156. CAHERNAGAT (67), in Ballymacrinan; a fine dry-stone fort.
157. CAHERADOON (67), in Doonagrogue.
158. *Cahirglassa* or *Caherslassa*, Dublin Registry of Deeds, 1715, book 20, p. 390, *Caherglas* or *Carrodonnet* in Teerivane, 1655, B.D., p. 369. *Teervarna* adjoins Doonagrogue at Caheradoon.¹

KILMURRY (30 forts).

159. *Cacernough*, near Kilmore, 1655, B.D., p. 356.
160. *Caherbane*, or Carhubane, 1655, B.D., p. 356.

¹ *Cahirlassa* *alias* Carroo. The two Domes, Derillogha or Teernane, 1675, evidently Derilough.

KILMIHIL (41 forts).

161. CAHERMURPHY (39).—Cahermurchada, 1594 Fiant; Cahermorrohow *alias* Carmore, 1655, B.D., p. 351; Cahermoroghue, 1735; Macgorman tombstone at Coad.
162. *Caher*, a nameless caher with high stone walls stands on a ridge in Cahermurphy on the road from Ennis, perhaps Cahermore, 1675.
163. CAHERCANAVAN (48), Cahirkeneven, 1601 Fiant.

KILFIDDANE (25 forts), AND KILLADYSART (18 forts).

164. CAHERCON (69) Cathair da Chon 1380, Kaerdoghon, 1569 map, Caheracon, 1819.
165. *Caherawn*, named with Caheracon in a grant to the Earl of Thomond to Mr. Scott, D.R.D, Book 27, p. 319.

Killofin Parish has 16 forts and Kilchrist 11, but no caher names.

ISLANDS.

KILMALEY (71 forts),

166. CAHERREA (41), Cathair Aedha, 1585, deed.
167. *Cahermore* (33), near Knockatunna, 1641 and 1655, B.D., p. 282.

DROMCLIFF (41 forts).

168. CAHERCALLA (33), Cahercalla, 1617 deed. Caherkillimore and beg, and even Fagherkillimore in B.D., p. 267, and map of same period. The fort has been partly rebuilt by the late Mr. Marcus Keane, and is a massive ring wall.
169. CAHERNAKIRKA (33), levelled since 1839.

CLARE ABBEY (26 forts).

170. *Cargowne*, near Barntick, 1665, B.D., p. 318. Perhaps one of the overthrown forts near Killone Lake.

CLONDAGAD (39 forts).

171. CAHERREA (42), rest of townland is in Kilmaley. Cahirea, 1585 Fiant; Cahera, 1655, B.D., p. 306.
Killone parish has 42 forts but no Caher names.

UPPER BUNRATTY.

INCHICRONAN (36 forts).

- 172. CAHER (18), Cagher, 1655, B.D., p. 98.
- 173. CAHERAPHUCA (26). Fort defaced; the fine dolmen is illustrated; Borlase, I., p. 82.
- 174. *Kahirduff*, or Chairduff, in Kilvoydan, 1655, B.D., p. 103.
- 175. *Charesconde*, in Dromintuke, 1655, B.D., p. 103.

TEMPLEMALEY (23 forts).

- 176. CAHERDERMOTYGREEFA (25). A small defaced fort in Ardcarney.

KILLAUGHTIS (63 forts).

- 177. CAHEREINY, in Ballyhogan (26); Cahereiny, 1557 Fianta. A large fort nearly levelled and with a souterrain; near it were two long dolmens. One has been levelled in making a road.
- 178. CAHERNALOUGH (34). .
- 179. *Chagherkernane* in Mohollogh, Kilroughtis, B.D., p. 124.
- 180. CAHERDINE (34) in Cappamore. Caherdine in Cappagh, 1655, B.D., p. 122, defaced.
- 181. *Chagherwillyhere*, in Cappagh, 1655, B.D., p. 122, near last.

DOORA (50 forts).

- 182. *Chahiremore* in Kilbreanbeg, 1655, B.D., p. 124; some nearly levelled forts remain. Perhaps Cahirenegrouh at Kilbrean, 1675.
- 183. CAHERLOGHAN (34), so named 1641 and 1655. A large defaced fort near a stream. In this townland is a group of five small cists, and at the opposite extremity an overthrown larger dolmen: see Borlase, I., pp. 83, 92.
- 184. *Cahergiridan*, 1580 Fianta, "Cahairgreddane," 1586 Inquisition. "Cahergiridan." Shown by Petty's map, 1655, and the B.D., to be near Carrahan, and perhaps the defaced but curious caher in that townland.¹

¹ Between Canagher and Classagh, 1675.

CLOONEY (52 forts).

185. CAHERSHAUGHNESSY (34), Cahershagenis, 1586. Inquisition of Teige M'Namara finn. A large fort with two rings. The inner 166 to 148 feet, the outer 567 feet in diameter, with a rampart of massive masonry six feet high and twelve feet thick. The gateway is defaced and to the west. Hut-sites and radiating walls to outer ring exist. *Described*, R.S.A.I., vol. XXXII., p. 287, by A. Gethin Creagh and H. B. Harris, with plans, etc., by T. J. Westropp.

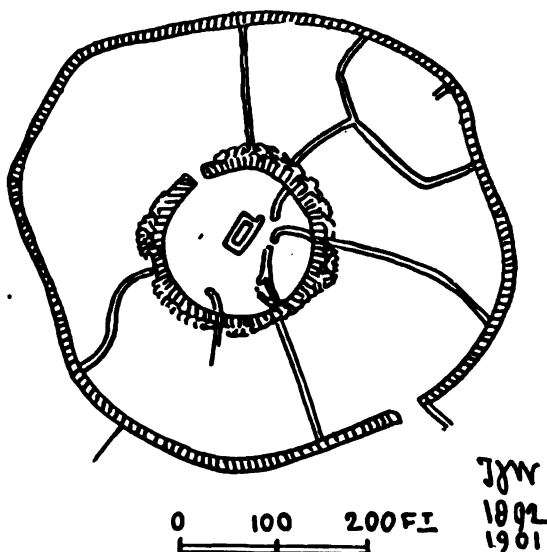


FIG. 4.—Cahershaughnessy.

186. *Cahergal*, 1641, near Maghery, and close to Tyredagh, 1655, B.D., p. 109. Near it was Coolaslúasta Lough, a primitive place of settlement described by A. G. Creagh and T. J. Westropp, R.S.A.I., xxv., p. 179.
187. *Cahershane*, part of Corbally, 1679 grant under Act of Settlement.

QUIN (78 forts).

188. CAHERCALLA (34); Cahercalla, 1641; Caherkelly, 1655, B.D., p. 141; also grant, 1679. A large, though rudely built, triple fort, with three rings. The inner is 141 feet diameter, with a

wall 17 feet thick and 8 feet high. The outer ring, 344 over all. Iron objects have been found in the walls. Not far distant are the mote, cairn pillar, and basin stone of Magh Adhair, Moyree, 1584 and 1839 (Moyer's Park at present), the place of Inauguration of the Dalcassian Princes. (See *infra*). *Described*, R.S.A.I., **xxiii.**, p. 432; and **xxvi.**, p. 150, and Proc. R.I.A., Ser. III., vol. iv., p. 56.

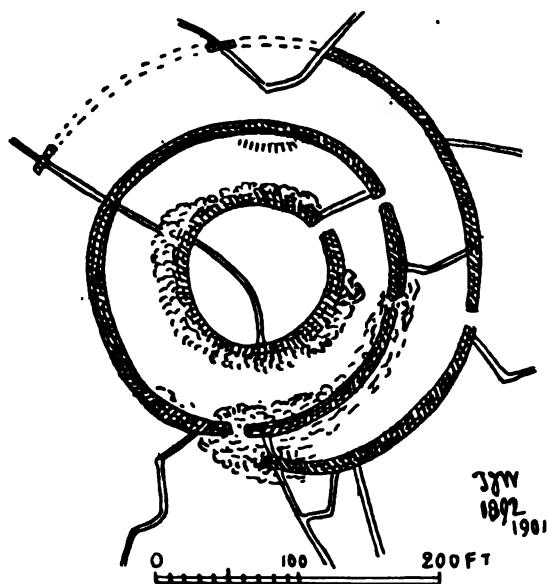


FIG. 5.—Cahercalla (Quin).

189. CAHER OF CREEVAGH (34), Cahermine, 1679 grant. Caherumine in Creevagh, 1655, B.D., p. 141 and map. Cahermine, Caher-munigan or Caheroine, 1660 grant. Caherbane, 1675. A perfect but featureless ring-wall, 100 feet diameter, wall 9 feet high and 8 feet thick; gateway to north-east; near last-named caher.
190. *Cahergrady*, near Quin, 1666 grant, probably on edge of parish near Caherkine. Cahergrady and Caherkine in Tomfinlough probably adjoined, 1728, D.R.D., Book 62, p. 220.
191. *Cahercragataska*, near Quin, D.R.D., 1787, Book 387, p. 273. Deed of the Creaghs, 1729, D.R.D., Book 62, p. 220.

192. *Cahermalla*, near Ballyroughan, 1678 grant, under Act of Settlement.
193. *Cahergal*, near Ballykilty, perhaps Kildrum fort, 1666 grant.

LOWER BUNRATTY.

KILNASOOLA (13 forts).

194. *CAHER* of Newmarket (51), a defaced fort with gateway to east; the wall of good masonry, 15 to 18 feet thick, 7 feet high, and batter 1 in 4. Gateway to south and another to the north.
195. *Chaghremonghan* in Ballysallagh West, 1655, B.D., p. 159.

KILMALEERY (8 forts).

196. *CAHERAFORIA* (51), Cahervory on the Fergus, 1666 grant.
197. *CAHERBANE* OF *CARROWBANE* (51); latter name on maps; not Caherribane, 1602.
198. *Cahirrebane*, 1602 Fiants. Caherribane, near Urlanmore, 1621 Inquisition. Cahirrobane, 1675.
199. *Caherony*, in Orlenmoyle, 1655, B.D., p. 164, or Caherowney, *alias* Cahereeny, 1727, D.R.D., book 81.
200. *Cahermarine*, in Orlenbeg, 1655, B.D., p. 164. Cahermaryne, near Urlan Castle, grant, 1667.

TOMFINLOUGH (23 forts).

201. *CAHER* of *MOGHANE* (42), Cahermoghna, 1590 map. Perhaps originally Caherkine, as it is covered by that townland in Petty's map, 1683. Possibly Cahermucna, 1720, D.R.D., Book 28, p. 412. A triple caher on a ridge overlooking Clare from the Shannon and Slieve Bernagh to Burren, Slieve Aughty and Callan; the fort is probably the largest caher in our islands; the central ring measures 350 by 380 feet, the second 650 feet across; the third, 1500 by 1100 feet over all. The whole is much overthrown. Lesser forts are inserted in the walls to the west in the outer ring, and to the south in the second; traces of circular hollows and radiating walls remain. R.S.A.I., xxiii., p. 281, with view and plan.

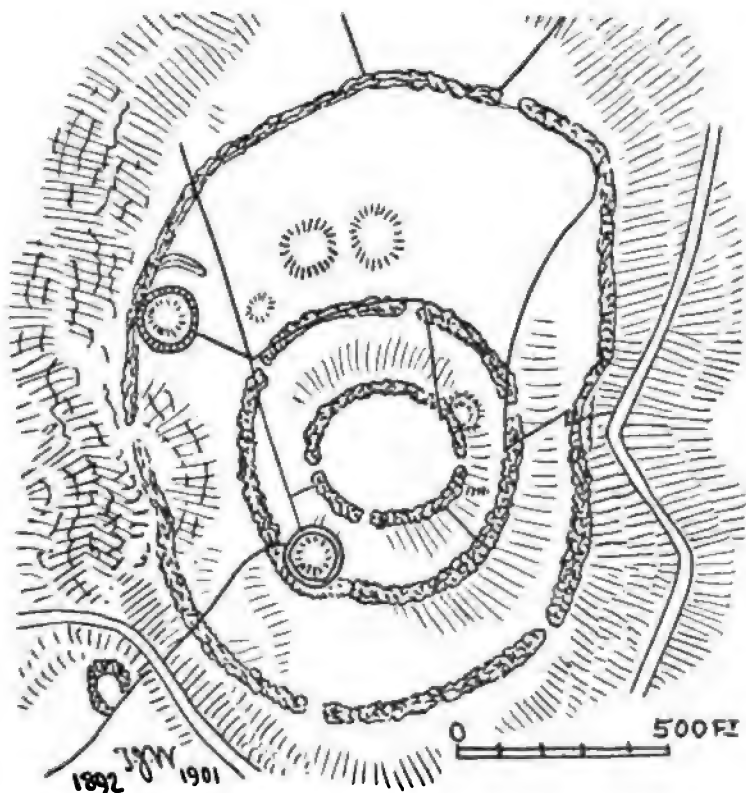


FIG. 6.—Moghane Caher.

202. **CAHER OF LANGOUGH (42)** lies south of the last on the flank of the ridge. It is a very remarkable structure, having been evidently rebuilt on a different plan across older foundations. At present it consists of a ring wall, 100 feet in diameter, of fine and shapely blocks on the edge of a low cliff. A less regular enclosure, 450 by 250 feet, surrounds this, meeting it at the cliff; while the foundation blocks of a large pear-shaped enclosure, 600 by 300 feet, girds the top of the knoll, passing under the second standing rampart. The foundations of two nearly parallel walls, 300 feet apart, run for about 400 feet to the south, the eastern making an abrupt turn inwards as it nears the border of Rathfolan townland, within which the foundations

have been removed. A defaced caher about 100 feet across lies near the eastern wall. *Description*, R.S.A.I., xxiii., p. 284, with view and plan.

- . Near these forts the cist, containing a mass of gold ornaments, was found, forming the "Great Clare find," 1854. *Catalogue of Gold Ornaments*, R.I.A., pp. 31-33.

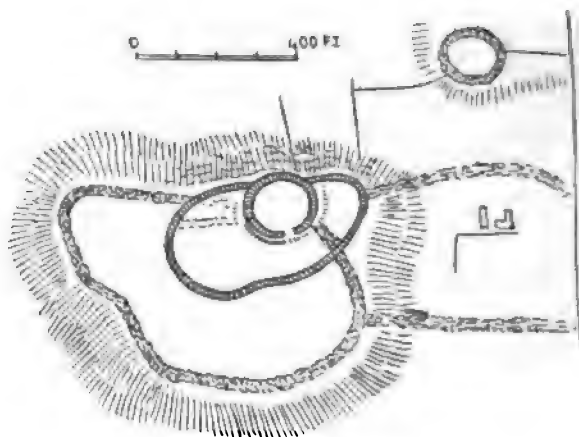


FIG. 7.—Langough Caher.

203. CAHERKINE (42), Cathrynachyne, 1287. Sir Thomas De Clare's Inquisition. Caherquin, *alias* Caherkin, 1719, D.R.D., Book 26, p. 512. In 1655 it included Moghane and Caherscooby.
204. CAHERSCOOPY (42), 1641. A defaced caher lies in the townland. Leah carroo : ne scuoby, 1675 Survey, p. 6.

CLONLOGHAN (22 forts).

205. CAHERTIEGE (51), so named in B.D., p. 171.

DROMLINE (15 forts).

206. *Caherfirogue*, 1617, in Dromline, perhaps Firgrove.

BUNRATTY (9 forts).

207. *Cahirhowhogan*, *alias* Deerpark of Bunratty, 1728, D.R.D., book 56, p. 467.

Kilmurry Parish has 12 forts, Kilfinaghta 29, Kilconry 5, Feenagh 12, Kilfintinan 5, Killeely 2, St. Munchin's 1, and St. Patrick's 3 forts, but no caher names.

TULLA UPPER.

TULLA (43 forts).

208. *Cahercottine*, 1397, lands granted to Tulla church. Probably in Cutteenmore or Cutteenbeg (Sheet 35).

KILNOE (44 forts).

209. CAHERHURLEY (28), caitir urthaille, 1380. It appears to have had an inner ring wall of stone now levelled, outside of which are a high earthen rampart, 180 feet across, a deep fosse, and an outer ring about 230 feet over all. It lies on a cultivated ridge. Several house foundations appear in the garth.

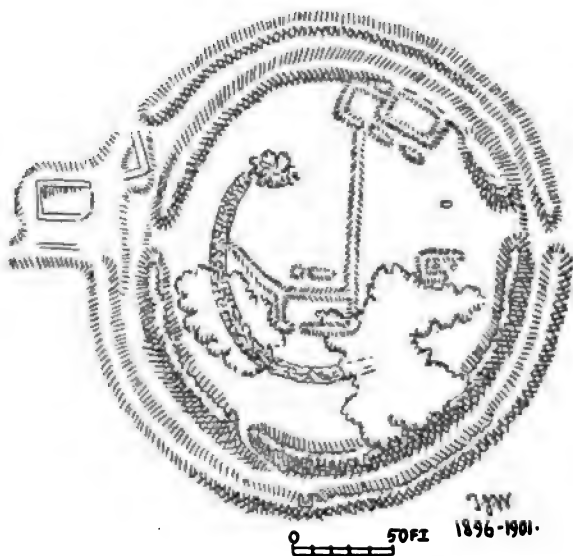


FIG. 8.—Caherhurley.

FEAKLE (10 forts).

210. CAHER, CAHERMURPHY (13), CAHER RICE and CAHER POWER (20), sub-divisions of the townland of Caher-Kagher, 1655, map. Cahermurrohow, Feakil, 1714, D.R.D. book 14, p. 28. Cahermurphy has a massive but defaced caher partly on a low rock.

TULLA LOWER.

OGONNILOE (29 forts).

214. CAHER OF ISLAND CAHER (29), whence King Conor na Cathrach, 1080–1120, was named, some state, from his having built the caher. “Caherballymolony, *alias* Island Caher, or Inishmahon in Togonela,” 1655, B.D., p. 43, 1675, p. 13.
215. *Caherderige* (perhaps the last) is named in a grant of Teige O’Grady, 1585. xv. Report of Deputy Keeper of the Records, Ireland.
216. CAHERDAVINE lies on the borders of this Barony in the Liberties of Limerick. Some nearly levelled cahers remain near it.

The forts in the other parishes of Tulla Lower are thus divided. Killuran 12, Clonlea 21, Kilseily 13, O’Brien’s Bridge 30, Kiltinanlea 8, Killokennedy 19, Killaloe 30; except the Caher of Kincora, no name of a caher is recorded.

OTHER NOTEWORTHY FORTS.

KILLALOE.

217. KINCORA (45), the well known residence of King Brian, 990–1014, had stone enclosures.¹ No trace remains.
218. GRIANAN LACHTNA (36). A fort of earth and stones in it is a long oval heap of stones, 80 feet by 50 feet, surrounded by a circular earthwork of two rings and a fosse much defaced, measuring 134 feet to 116 feet across the fort, the fosse being 17 feet wide. It was made by Lachtna, King of Thomond, *circa* 840. *Description*, R.S.A.I., xxiii., p. 191.
219. BEALBORUMA (36), locally Balboru fort. Kennedy and Mahon, Kings of Thomond, probably made this fort, *circa* 950–70, as Mahon is called “of Boruma” (but perhaps from that ford) in the “Wars of the Gaedhil with the Gaill.” King Brian took his well-known appellation from it. It is a large earthen ring fort, 380 feet round the top, and 650 feet at the base, with a high earthwork and a fosse at the end of a long spur where the Shannon leaves Lough Derg. The entrance is to the north. *Description*, R.S.A.I., xxii., p. 193.

¹ “The timber and stones” were thrown into the River, 1118.

KILFENORA.

220. DOON (16). A conspicuous fort, 296 feet by 310 feet, at the eastern end of a long ridge near Kilfenora. It is pear-shaped in plan, and consists of a well-cut fosse in the shale rock, 20 feet by 25 wide, and 5 feet deep. The ramparts of the fort are of earth; the dry-stone facing remains in parts; the platform is 15 feet above the field. There are two entrances to the west, one had a mound crossing the fosse, the other had a plank or drawbridge resting on a square-cut projection of shale rock. There was an entrance to the east above the steepest slope of the hill, reached by a flight of steps cut in the rock. *Description and plan, R.S.A.I., xxvii., p. 126.*

KILBALLYOWEN.

221. DOONDOILLROE (65). A promontory fort, consisting of a fosse between two earthworks curving outwards across the neck of a headland of the cliffs of Tullig. The country slopes from the coast, so that this fort is a conspicuous object inland.

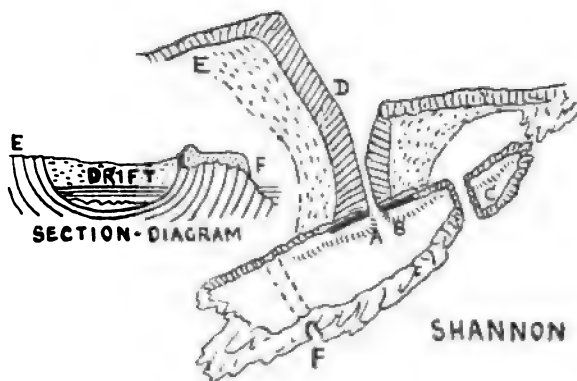


FIG. 9.—Doonmore—Horse Island.

222. DOONMORE OR HORSE ISLAND (71). A fort of very unusual design from its adaptation of natural features. It is founded on a peninsula joined to the land by a long bank of drift, about 100 feet high, which seems to have been shaped artificially (v). A shallow bay is formed in the curving strata on each side, and

where the rock bends up and makes the abrupt landward face of the peninsula, a dry-stone wall has been built at the same batter and backed by a mound. The eastern end of the peninsula has been isolated by the sea; the earthwork still appears on it (c). There are middens of limpets and other shells with polished pebbles inside the entrance at the causeway (A, B). *Description*, R.S.A.I., xxviii., p. 410.

CLOONEY IN BUNRATTY.

223. **MAGH ADHAIR** (34). Seems to be a true mote. It is a nearly circular, flat-topped mound, the platform 100 feet across, and a high fosse and outer ring surround it, and a sloping causeway leads to the summit at the west side. A large cairn, 17 feet high, lies at the foot of this on the bank of the stream. The mote stands in a semicircular enclosure, with a natural amphitheatre of crags called Cragakeeroge. A basin stone lies north of the mound, and across the stream, about 140 feet away, is a pillar, 6 feet 3 inches high and 2 feet 6 inches broad. This place was used by the Dalcassians from the earliest times for the inauguration of their chiefs. *Description*, R.S.A.I., xxi., p. 462, 463, with view. *Proc. R.I.A.*, ser. iii., vol. v., p. 55, with plan.

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XXIII.

HIPPARCHUS AND THE PRECESSION OF THE EQUINOXES.

By REV. MAXWELL H. CLOSE, M.A.

[Read MAY 13, 1901.]

WE assume, in agreement with the general belief, that it was the admirable Hipparchus who first discovered what we now designate as the Precession of the Equinoxes. This has, indeed, been questioned by a few writers. But the elaborate discussion of this matter by Th. Henri Martin¹ seems to have thoroughly vindicated the claims of Hipparchus in this respect.

The immediate, prime particular of his great discovery was the increase of the longitudes of certain fixed stars during the period between the observations of those stars made by Timocharis and Aristyllus, on the one hand, and himself, on the other. The longitudes had increased by nearly two degrees.

This increase of the longitudes of the fixed stars might conceivably be produced in one of three different ways; viz.—

- (1) By the eastward progression of the stars themselves.
- (2) By the westward retrogression of the equinoctial points, from one of which the longitudes are measured.
- (3) By both these movements existing together, each producing its own share of the whole precession.

This last may be dismissed at once for its unnecessary complexity; especially as we do not know of more than two writers² who have seriously entertained it. The choice, then, lies between the first and the second; that is between the progression of the fixed stars, and the retrogression of the equinoctial points.

If we were concerned simply with the increase of the longitudes of the stars, or the relative motion between the stars and the equinoctial points, it would be of little importance which of the alternatives we selected. But there is here vastly more than a mere question of relative motion. The progression of the stars leaves the Earth unmoved; but the retrogradation of the equinoctial

¹ "Mems. de l'Acad. des Inscript., tom. viii., part 1, 1869.

² Messahalah, a Jew patronized by the Khalif Al Mamun, fl. about A.D. 800. In *De Scientia Motus Orbis, or De Elementis et Orbibus Cælestibus*. Also Fracastorius, "Homocentrica," Sectio ii.

points involves a retrograde oblique turning of the plane of the Earth's equator, that is, a turning of the Earth itself. Ptolemy and his successors chose the former alternative, the progression of the stars. We, of course, know that we must abide by the latter, the retrogradation of the equinoctial points.

But which of these alternatives did Hipparchus himself adopt? It is the object of this paper to obtain, if possible, an answer to this question. This is an interesting and not unimportant point in the history of astronomy. Besides, our reverential regard for the Founder of mathematical astronomy, that "labour-loving and truth-loving man," as Ptolemy calls him, must make us desirous, for personal reasons, to find out, if we can, what may have been his decision on this matter.

It might be said—But surely this question, if it can be settled, must have been settled long ago by writers on astronomy or on its history. Let us, then, in the first place, appeal to some of those writers for information on this point.

However, when we do so, we find, at once, a remarkable difference of opinion existing amongst them. We have collected into Group A, below, the names of some astronomers who tell us that Hipparchus selected the progression of the fixed stars; and into Group B the names of some others who tell us the opposite, *i.e.*, that Hipparchus selected the retrogression of the equinoctial points; the names being arranged in each group in approximately chronological order.

GROUP A.

Ptolemy. ²	Laplace. ⁷	Arago. ¹²
Copernicus. ³	Lalande. ⁸	Hoefer. ¹³
Riccioli. ⁴	Long. ⁹	Flammarion. ¹⁴
Gregory. ⁵	Rothman. ¹⁰	Wolf, Rudolf. ¹⁵
Weidler. ⁶	Narrien. ¹¹	

2 Almagest, Bk. III., ch. 1, and Bk. VII., chs. 1, 2, 3.

3 De Revolutionibus Orbium Cælestium, Bk. III., ch. 1.

4 Almagestum Novum, vol. I., Pt. 1., p. 164, col. 2.

5 Elem. of Astron., vol. I., p. 314.

6 Hist. Astronomiæ, ch. VI., p. 142.

7 Méc. Cél., Bk. XIV., ch. 1., and Syst. du Monde, Bk. V., ch. II.

8 Astronomie, vol. I., p. 406.

9 Astronomy, Bk. V., pp. 677 and 680 (1785).

10 Hist. of Astron., in Libr. of Useful Knowl pp. 25 and 27.

11 Hist. of Astron., pp. 223 and 252.

12 Astron. Populaire, vol. IV., p. 95.

13 Hist. de l'Astron., p. 172.

14 Vie de Copernic, p. 10.

15 Geschichte der Astron., p. 158.

(¹⁴) Flammarion, in his *Vie de Copernic*, p. 135, foot-note, quoting the preface to Copernicus' *De Revolutionibus*, mentions a letter from Lysis to Hipparchus, whom Flammarion calls *ancien Pythagoricien*. But this Hipparchus, being a contemporary of Lysis, lived about 100 years before the great astronomer of that name.

GROUP B.

Montucla.¹⁶Bailly.¹⁷Delambre.¹⁸Vince.¹⁹Woodhouse²⁰ (pre-
sumably).Whewell.²¹Martin.²²Ball.²³Newcomb.²⁴Young.²⁵Berry.²⁶¹⁶ Hist. des Math., vol. i., p. 264 (1808).¹⁷ Astron. Moderne (*sic*), vol. i., pp. 109, 110.¹⁸ Astron. Ancienne, vol. ii., pp. 247, 249, 250, and Biogr. Generale, under "Hipparchus," p. 399.¹⁹ Astron., vol. ii., p. 257.²⁰ Astron., p. 339, presumably.²¹ Hist. of Induct. Sciences, vol. i., p. 144.²² Mems. de l'Acad. des Inscriptions, vol. viii., Pt. i., 1869, p. 438.²³ Great Astronomers, p. 5.²⁴ Popular Astron., p. 19.²⁵ General Astron., 2nd ed., p. 132.²⁶ Hist. of Astron., p. 52.

(¹⁶) Montucla, in the first ed. of his Hist. des Math., represented the title of Hipparchus' tractate on the precession as "Concerning the Retrogradation of the equinoctial points," which he took literally; thus placing himself in our Group B. But perceiving afterwards that Hipparchus' word *μεταστροφαις* means only 'shifting,' he, in his last ed., transfers himself to our Group A. In this, however, he makes a mistake, because if there be any shifting of the equinoctial points, it must be a retrograde one, so that he still belongs to Group B.

(¹⁷) Bailly, in his Astron. Moderne, vol. i., p. 109, near bottom, and p. 110, puts himself into Group B; but by a curious slip of the pen, in p. 553, he makes Hipparchus explain the precession of the equinoxes by the progression of the stars and the retrogradation of the equinoctial points.

None of these, except Riccioli, refer to the existence of any difference of opinion on the subject.

Some of those in Group B are not content with merely asserting the alternative that they have chosen for Hipparchus; but, for greater emphasis, they likewise exclude the other. See, for instance, Delambre, who says¹: "for it was not to the stars that he [Hipparchus] attributed this movement; but to the equinox, from which all the longitudes are reckoned."

The above writers give no reasons for their conflicting opinions; but some of those in Group B are plainly influenced by the consideration that such a man as Hipparchus would naturally see the matter from what we know to be the correct point of view.

There are a few writers who do not let us see to which Group they belong; as though it were a matter of indifference whether Hipparchus believed the stars to move progressively, or the equinoctial points retrogressively.

Since our teachers do not agree together to answer this question for

¹ Biogr. Generale, under "Hipparque," p. 399.

us, we may perhaps be pardoned if we try to discover, for ourselves, what reasons there may be which might lead to a settlement thereof.

We shall find that there are three arguments, of very different kinds, which, it is submitted, lead undeniably to the conclusion that Hipparchus considered that he had discovered the progression of the stars, and not the retrogression of the equinoctial points.

The *first argument* is drawn from what we must believe to have been the state of Hipparchus' mind respecting the question of the immobility of the Earth. There can be no doubt that Hipparchus shared the prevalent belief of his time in the immobility of the Earth, and consequently in the diurnal rotation of the stellar firmament. It is quite unnecessary to quote, as we could do, Lalande and others in support of this. The only work of Hipparchus which has come down to us—his commentary on the poem of Aratus on the Constellations—gives no indication that his view differed from the ordinary view respecting the diurnal rotation of the firmament; and his discussion of the annual revolution of the Sun and of the monthly revolution of the Moon round the Earth, as handed down to us by Ptolemy, shows that he saw no difference as to the actual nature of both; though he carefully discusses the difference of their details. Ptolemy was evidently quite unconscious of any disagreement between Hipparchus and himself on these points.

If, then, Hipparchus could concede to the vault of heaven the violently rapid diurnal rotation on the poles of the celestial equator, which was contemplated by his contemporaries, he could have no hesitation in giving it a nearly opposite serenely slow rotation on the poles of the ecliptic, once in nearly 26,000 years; in order to explain the precession of the equinoxes. From his point of view it would be far more natural and reasonable to assign the newly-discovered gentle motion to the already moving stellar firmament, than to give it to the supposed stationary, perhaps immovable Earth, as would be required by the retrogradation of the equinoctial points. This, of course, does not *prove* that Hipparchus posited the progression of the stars; but it makes it exceedingly difficult to believe that he did not do so. It at least shows that he would have a strong predisposition against believing in the retrogradation of the equinoctial points.

The *second argument* is drawn from the treatment of the statements and expressions of Hipparchus, himself, by Ptolemy in his *Almagest*; where alone we can obtain any authentic information on the subject.

The places in that work which now concern us are Book III., chap. 2, and Book VII., chaps. 1, 2 and 3; but the best order of

procedure will be to begin with chaps. 2 and 3 of Book VII., since it is there that we have Ptolemy's account of what Hipparchus wrote on the subject.

We find that, when Hipparchus mentions the equinoctial points, as he does in the title of his tractate on the precession, and in the text of another tractate quoted by Ptolemy, he speaks of them as shifting, which, in this case, as we shall see, involves retrogressing. But when he mentions the stars with which he is immediately engaged he speaks of them as progressing, without adding "relatively" in either case. This is natural enough for convenience; but the great probability is that some of the writers referred to above abide by one, and some by the other, and that this is to a great extent the origin of the disagreement between them. If Hipparchus' own words, as handed down to us by Ptolemy, be taken by themselves, they will not enable us to settle the question now in hand. We must consider the treatment of them by Ptolemy, who was in a better position than we are for understanding them.

Before proceeding, let us say a few words more on a particular just referred to. The title of Hipparchus' tractate is, "*Concerning the shifting of the tropical and equinoctial points.*" Hipparchus' word for 'shifting,' μετακίνησις, could mean shifting forwards, as well as backwards. But, in the present case, any change of position, except a backward one, is altogether out of the question. If, then, there should be any shifting, or change of position, of the equinoctial points on the ecliptic, it must be a retrograde one; and therefore Hipparchus' word, μετακίνησις, necessarily involves this meaning, though it does not etymologically express it. We can, therefore, with Delambre and others, represent, though not translate, the title of Hipparchus' tractate thus—"Concerning the retrogradation of the tropical and equinoctial points."

But, as we have said, Hipparchus, in his discussion of the stars more particularly in question, speaks of their progressive motion. Although at first sight this may seem inconsistent, it is really not so. When we are thinking simply of the increase of the longitudes of the fixed stars, or the mere relative motion between them and the equinoctial points, it comes to the same whether we speak of the progression of the stars, or the retrogression of the equinoctial points, from one of which those longitudes are reckoned. Just as the relative motion between the Sun and the eastern horizon, in the morning, which we know to be due to the downward turning of the horizon there, is almost always spoken of, even by the astronomers themselves, as the rising of the Sun. This last expression is not to be taken literally.

Similarly, either the title of Hipparchus' tractate, or his language therein respecting the stars, is to be taken in a non-literal sense.

We shall now consider Ptolemy's treatment of the title of the tractate, which, as we have said, is equivalent to "*Concerning the retrogradation of the tropical and equinoctial points.*"

Be it always remembered that Ptolemy had the tractate before him, which we unfortunately have not; and he would doubtless know whether the title of it, or the expressions in the text respecting the stars, were to be taken literally. But if Ptolemy knew that that title was intended by Hipparchus to be taken literally, he would not treat it as he does in the following instances. In chap. 2 of Book VII., not far from the beginning, Ptolemy mentions, from himself, that the sphere of the fixed stars has its own proper motion according to the succession of the signs, that is progressively. He then proceeds *immediately* to quote without comment the title of Hipparchus' tractate, which implies the retrogression of the equinoctial points. Again, in chap. 3, Ptolemy quotes the title of Hipparchus' tractate on the precession, without comment. He then speaks himself, and makes Hipparchus speak, of the progression of the stars. Now if Ptolemy knew that Hipparchus intended the title to be taken literally, all this would be like a disrespectful slighting of the words of his revered master. It would be a passing-by of Hipparchus' expressions without any notice, as though they were not worthy of correction. A similar remark may be made respecting the passage already alluded to near the end of chap. 2. Ptolemy there quotes another tractate of Hipparchus, "*Concerning the Length of the Year,*" in which Hipparchus writes thus:—"For if, for this cause, the solstices and equinoxes might be moved backwards, not less than $\frac{1}{100}$ th part of a degree per annum," &c. Then Ptolemy *immediately* after, without comment, speaks of *Spica Virginis* and the brightest stars of the zodiac as having progressed, by that amount, according to the succession of the signs.

We might confidently conclude, even from all this alone, that Ptolemy did not take literally the title of the tractate, which implies the retrogradation of the equinoctial points, nor the expression, just quoted from the text, in which Hipparchus speaks of the equinoctial points as being moved backwards; any more than we should take literally the words of a modern astronomer when he speaks of the rising of the Sun. There is no argument corresponding to this which can be advanced on the other side.

Now we turn back to chap. 1 of this Book VII. of the *Almagest*; and we there find Ptolemy's own direct statement that Hipparchus

supposed that the sphere, in which the stars seem to be fixed, has a forward motion according to the succession of the signs. We have the same also in Book III., chap. 2, near the beginning. This shows that Ptolemy took literally Hipparchus' language in the text of his tractate, when he speaks of the forward motion of *Spica Virginis*, and some other stars which he discusses, and that therefore he did not take literally the title of that tractate. Ptolemy, who ought to know, and doubtless did know, evidently believed that Hipparchus' opinion on the point in question was the same as his own, which was that the phenomenon of the precession was produced by the absolute, and not merely relative, progression of the stars.

The *third argument* is founded on an interesting temporary error of Hipparchus, which was very soon corrected by himself.¹ Only a few lines below the place last referred to, in the *Almagest*, we are told by Ptolemy that when Hipparchus had examined only certain zodiacal stars, and had observed their apparent progression, he supposed that the extra-zodiacal stars did not participate in that progression. But he could not possibly have supposed this had he believed in the retrogradation of the equinoctial points; for that would give an apparent progression to *all* the stars. He found afterwards, however, that the stars outside the zodiac preserved their positions relatively to those within it; which, from the strong predisposition which he must have had against the retrogression of the equinoctial points, would mean for him that all the stars progressed together.

It is submitted that these arguments, taken together, seem to make it morally certain that Hipparchus did not believe in the *actual* retrogradation of the equinoctial points.

¹ Martin, *ubi supra*, p. 438, mentions this temporary error of Hipparchus; but, it is submitted, makes quite a wrong use of it, turning it into an argument to favour the contention of the members of Group B. Bailly, *ubi supra*, p. 108, also seems to miss the point of it.

XXIV.

REMARKS ON A COSMOGRAPHICAL TRACTATE IN THE
IRISH LANGUAGE IN THE LIBRARY OF THE ROYAL
IRISH ACADEMY. BY REV. MAXWELL H. CLOSE, M.A.

[Read JUNE 17, 1901.]

THE manuscript now to be considered consists, as we shall see, of a translation from the Latin; it is Irish only as to its language. It is beautifully written on vellum, in a small hand of about A.D. 1400. This copy is complete, except for the illegibility of the last (outside) page.

There is also, in the Academy's library the first half of another copy, a facsimile illustration from which is given in O'Curry's Lectures on the "Manuscript Materials of ancient Irish History." There is also in Marsh's Library, Dublin, another copy which is complete, except for the illegibility of the last (outside) page. The last two are quite of the same style, and evidently of the same date, as the first-mentioned one; they are likewise on vellum. If we might venture to judge from a perhaps insufficient collation, the copy in Marsh's Library seems to be, as to its text, rather superior to the whole copy in the Academy; but as to its diagrams it is decidedly inferior thereto. It agrees more closely, in both respects, with the half copy in the Academy.

Two-thirds of the contents of this tractate are found to be a more or less close version of a work by Messahalāh (Mascha Allah), a Jew of Alexandria who wrote in Arabic; he flourished shortly before A.D. 800, and lived in the reigns of the Abasside Khalifs, Almansur, Haroun Alraschid, and Almamun; the last being a patron of Messahalāh. The remaining chapters of the tractate, twelve in number, are from some other source (possibly sources); they are clearly not from any work of Messahalāh himself, though he did write various other works, astronomical and astrological, which have come down to us. Some, at least, of these chapters are much later than Messahalāh's time. One of them, Chapter 7, contains mention of glass spectacles as used by old people to read with; this was first done about A.D. 1320. Another

(Chapter 35) carries the Habitable Climates (of which more below) farther northwards than would have been done in Messahalah's time. Another, Chapter 14, strongly reprobates certain ideas in natural (not judicial) astrology, which were maintained by Messahalah himself.¹

Although two others of these Chapters, 14 and 35, are inconsistent with each other on one point, it seems likely that all these twelve chapters have been derived from the same source; we shall, for convenience, suppose this to be so, without building anything upon it, and we shall consider them as written by Duodecimalis, without asking ourselves whether he is a person or only a personification.

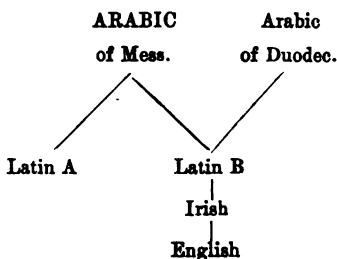
There are several indications that Duodecimalis was an Arabic writer. He seems to have belonged to the schools of Morocco or Spain decadent in his time. In Chapter 17 Egypt and Africa are spoken of as differing in time by several hours. Therefore, "Africa" evidently means here, as it did originally, the district about Carthage. Already, in the third century of the Christian era, the name "Africa" was extended by the Romans to all the coast west of the Great Syrtis; and we may well believe that in the much later times of Duodecimalis the wide application of the name was well established outside of the said district about Carthage (or about Tunis). But it must have been still preserved as a special distinctive name within and near that district in the time of Duodecimalis, because even at the present day the people of those parts call that district by the name of Afrikiyah. Therefore the comparatively late Duodecimalis lived, in all probability, near that district.

That the Irish version of the Tractate is, as we have said, derived from a Latin one, is evident from this, that at the head of each chapter in the Irish are given the leading words of the corresponding chapter in the Latin exemplar for the more ready identification of the chapters, and also that Latin words are used here and there in the text, when convenient, as in the names of the principal circles of the firmament, &c. An English translation has been made very carefully from the Irish by Mr. John J. O'Farrelly in the Academy House, to which illustrative notes have been appended by the present writer. These notes, by the way, give the late history of the ms.

Messahalah's work which, as we have said, occupies two-thirds of the present tractate, was translated from the Arabic into Latin by Gerard of Sabbionetta, near Cremona, in the thirteenth century. His translation was edited by J. Stabius, and printed at Nuremberg in 1504,

¹ See his "De ratione Circuli et Stellarum, et qualiter operantur in hoc Sæculo."

with the title *De Scientia Motus Orbis*. A copy of this is in the Library of the Academy. It was afterwards edited by Joachim Heller, and printed at the same place in 1549, with the title *De Elementis et Orbibus Coelestibus*. But the Latin version from which the Irish translator worked was quite different from Gerard's translation. This appears at once when the Latin words, mentioned already at the beginning of each chapter in the Irish and in the English translation, are compared with the leading words of the corresponding chapters in Gerard's translation.



The above genealogical scheme shows the relations of the various works, or translations, to each other. "Arabic of Mess." is Messahalah's original work, whence is derived, on one hand, Latin A, by Gerard, and on the other hand, in connection with the "Arabic of Duodec.," Latin B, by the compiler of the *Cosmography*; of whose existence we have tokens in the leading Latin words in the Irish (and in the English) translation. We may conclude from the nearness of these Latin words to the corresponding words in the Irish text, that the Irish is a close translation of the Latin. That the English is such of the Irish can be seen by comparing them.

Some pairs of corresponding chapters in Latin A and in the Irish agree pretty closely: although there are three versional steps between them. Others are related to each other like free translations, and a few like free paraphrases. This is clearly due to the compiler of the *cosmography* or the writer of Latin B, whose main object was evidently not to give a translation or a new edition, of Messahalah's work; but simply to use him, as he pleased, as one of the sources of his own compilation. In some places Gerard's Latin A is superior to the Irish; in some the Irish is the better of the two.

The meteorology of Messahalah and of *Duodecimalis*, the original author, or authors of the twelve chapters above mentioned, is Aristotelian; the astronomy is Ptolemaic, which, of course, is perfectly

allowable in them and interesting. But their handling of the latter subject is decidedly inferior scientifically to that of Alfergani, a later contemporary of Messahalah, and of Albatani, who came two or three generations later. A small number of the improprieties in the present tractate are of a very remarkable character; some, however, are only of the nature of blunders, the matter in hand being given correctly elsewhere.

We shall now make a few remarks on some of the salient points in the tractate under consideration.

It is interesting to observe that Messahalah, who looks up to Ptolemy as "the Philosopher," and his honoured master, departs from the teaching of his preceptor on several points, sometimes even while appealing to his authority. For instance, in Chapter 18, Messahalah gives a demonstration that the Sun is larger than the Earth. He gives this demonstration as Ptolemy's; but Ptolemy's is quite different, and vastly superior.

Again, it is evident that Ptolemy regarded the fixed stars as shining by their own proper light; but Messahalah, in Chapter 21, and elsewhere, speaks of those stars, as shining by reflected sunlight. In this he is countenanced by Isidore of Seville, Albertus Magnus, and incredible as it may seem, even by Copernicus himself; to these we may add (from Riccioli) Metrodorus, Albatani, Vitellio, Reinhold, Blancanus and Scheiner. So that Messahalah errs herein in very good company.

In Chapter 22 Messahalah shows most correctly that we may have an annular eclipse of the Sun, but Ptolemy states that the angular diameter of the Moon is never less than that of the Sun; which would make such an eclipse impossible. Here Messahalah has the advantage over his master.

In Chapter 27, he refers to Ptolemy as positing ten spheres for carrying the planets and stars round the Earth; but Ptolemy mentions only eight; one for each of the seven planets (including the Sun and Moon), and one for the fixed stars.

In Chapter 27, Messahalah gives what is really an illustration from a potter's wheel, which was proposed by Cleomedes, to explain the compounding of the direct or eastward proper motions of the planets with the westward daily rotation of the firmament. This illustration, however, he assigns to Ptolemy.

By the way, we seem to have, in this same chapter, an interesting proof, that Gerard of Sabbionetta, who wrote Latin A, and the writer of Latin B, from whom the Irish translator worked, had different

Arabic texts of Messahalal before them. Gerard gives us "*bathara*," without explanation, in three places. It is evident that he did not know what this meant, and therefore simply copied it in Roman letters from the Arabic original. But as the Irish translator gives in this place *roth* (the Irish for wheel), it is clear he had *rota* before him in Latin B. This shows that the writer of Latin B, must have had before him in his Arabic exemplar, not the corrupt and unmeaning *bathara*, but the proper Arabic word for wheel.

Perhaps Messahalal's most remarkable departure from the ideas of Ptolemy occurs in his mode of producing the precession of the equinoxes. Ptolemy held that this was caused by the eastward progressive turning of the sphere of the fixed stars, at the slow rate of 1° in a hundred years. Messahalal gives this progressive motion to the stars, at the same rate; but he also makes the equinoctial points and zodiacal signs move retrogressively along the ecliptic; though at what rate he does not say. This latter would have been peremptorily rejected by Ptolemy; as it would involve, of course, a movement of the Earth which he altogether repudiated; besides giving too great a relative motion between the stars and the equinoctial points. Messahalal doubtless did not perceive this consequence, for he also did not believe in the mobility of the Earth. It is evident that he was misled by some apparently (not really) mutually inconsistent statements of Hipparchus on this question, as he is presented to us by Ptolemy in the "*Almagest*," Book VII., Chaps. 1, 2, 3 (see last paper on Hipparchus).

Others have erred as well respecting the belief of Hipparchus on this subject, and most probably for the same reason. One group of distinguished astronomers and historians of astronomy tell us that Hipparchus explained the precession (solely) by the progression of the fixed stars; another equally distinguished group tell us that he explained it (solely) by the retrogradation of the equinoctial points; one of these groups is, of course, quite mistaken on this question. Messahalal has Fracastor with him in his mistake of using a quite unnecessary sphere to carry the equinoctial points backwards.

The explanation of this seems to be that Messahalal was among the very earliest "Arabian" astronomers to whom the "*Almagest*" was accessible in an Arabic translation. Haroun Alraschid ordered a translation of it (probably more than one) in the earlier part of Messahalal's career. The work, as might be expected, was found at first very difficult, and the results unsatisfactory; and it was not until A.D. 827, that a sufficiently good translation was published at the

command of the Khalif Almamun, son of the illustrious Haroun. This probably came out too late for Messahalāh to avail himself of it when writing the work which we are now concerned, if indeed he were still alive at that time.

The zodiacal sign, Pisces, is referred to in Chapter 14 (by Duodecimalis), and in Chapter 32 (by Messahalāh), and elsewhere, six times altogether, and is invariably written in the singular, *Piscis*. It occurs thus once (and also as *Pisces*) in Gerard's translation, Latin A.

In Chapter 8 Duodecimalis gives us a very interesting discussion on geological subaerial denudation. It reminds us of what may be found in Avicenna on the subject. The idea that subaerial denudation has been the great carver of the surface features of the Earth is comparatively recent amongst geologists. Hutton was the first to bring it strongly and prominently forward in his *Theory of the Earth*, in 1785 and 1795; though he was not the originator of it. But in this ms. we find that Duodecimalis had a fair idea of it above 400 years before.

In Chapter 11 we have from Duodecimalis an account of the Tides very similar to what we have in Strabo and in Pliny. (Pliny's *Natural History* was greatly used in the Middle Ages). This account of the tides, though, of course, very imperfect, is surprisingly good for the time. It has been known from the time of Posidonius before the Christian Era that the tides are connected with the Moon, and probably produced by her in some way. Kepler, in 1609, threw out the idea, apparently original with himself, that they are caused by a magnet-like attraction of the Moon. Lalande points out that he was anticipated in this by the Jesuits of the University of Coimbra in their Commentary on Aristotle's *Meteorologica*, published in 1596, thirteen years before. But we find that they were themselves anticipated, on this matter, in our Irish ms., which was written about 200 years before their Commentary.

In Chapter 34 Duodecimalis makes the ratio of the circumference of a circle to its diameter to be as 3 to 1. If he were a Jew, like Messahalāh and many other prominent "Arabian" astronomers, he would probably feel himself bound to go by 1 Kings vii. 23; though this is not to be taken literally. But it was known long before among the Arabians, as by Alfergani, in the time of Messahalāh, that the ratio is, as was shown by Archimedes, very nearly as $3\frac{1}{2}$ to 1.

It is observable that there are fewer references to the Creator, and

much fewer Arabic words retained in the Irish than in Gerard's Latin translation. Indeed, the only Arabic word in the Irish translation is *al kotëra*, in Chapter 34, by Duodecimalis; it is given quite unnecessarily, as it is translated for us as the diameter.

We shall conclude with Chapter 35, which treats of the Seven Habitable Climates of the Earth; it is by Duodecimalis. His scheme of the Habitable Climates is a great improvement on that adopted and given by Alfergani, the later contemporary of Messahalal, which continued more or less in vogue, strange as it may seem to us, until after A.D. 1500. These climates were belts or zones of latitude beginning at lat. $12\frac{1}{2}^{\circ}$ N., below which the Earth was supposed to be uninhabitable from heat, and extending up to lat. $50\frac{1}{2}^{\circ}$ N., above which the Earth was supposed to be, on account of the cold, not habitable in the full proper sense of the word. According to that scheme, Ireland and Great Britain are not among the habitable countries of the earth; or at best they are only *prava habitationis*. It is strange that the excellent Johannes de Sacrobosco did not perceive how, in accepting this scheme, he was libelling his native country. But Duodecimalis, with his more enlightened views, makes the first habitable climate to begin at the equator, and the seventh or highest one to reach up to where midsummer day is 18 hours long, that is to lat. $58\frac{1}{2}^{\circ}$ N., or nearly to the northern extremity of Scotland. But while making this concession to us with one hand, he takes quite as much from us with the other. Ireland, England, and nearly all Scotland are contained within his sixth and seventh climates, the highest two. But he says of the sixth, which reaches up to $54\frac{1}{2}^{\circ}$ N., about the latitude of Dunganon, Lisburn, Whitehaven, and Whitby. "The people of this region are weak of body, and of a bright colour, having sleek hair, brutal and intractable." Those of the seventh climate, above the last-mentioned latitude, "are unintelligent, hard to be instructed, weak of understanding, having a memory like that of the brutes, weak in body, and having fair, fine, yellow hair."

These schemes of the Habitable Climates were drawn up by people living in more southern latitudes than ours. The short account of the physiography is quite in keeping with that of the anthropology of these climates. The character and conditions of each climate are supposed to be the same throughout its whole extent in longitude.

Assuming that the mention of spectacles, above referred to, was in Latin B, and not added by the Irish translator, Latin B was written

some time after about A.D. 1320 ; while the Irish translation of it was written about 1400, giving doubtless time enough for the Tractate to reach Ireland and get translated there. We have a somewhat similar contemporaneous case, that of the famous *Rosa Medicinæ Anglicana* written by John Gaddesden, who died in 1361. Extracts from that work were translated into Irish in the Yellow Book of Lecan in 1390.

XXV.

THE PHOENIX PARK, ITS ORIGIN AND EARLY HISTORY,
WITH SOME NOTICES OF ITS ROYAL AND VICEREGAL
RESIDENCES. BY C. LITTON FALKINER, M.A.

[READ MAY 13, 1901.]

THE Phoenix Park is the greatest and most abiding monument of that extraordinary revival and extension of the Irish capital which followed the Restoration, and which in the space of a few years transformed Dublin from a mediæval city into a modern metropolis. Down to the era of the Commonwealth Dublin had remained a walled town, within the ambit of whose fortifications little or no change affecting its general appearance had taken place for a couple of centuries. From the days of the later Plantagenets to those of the later Stuarts, it may almost be said, no scenic transformation on a large scale was effected in the aspect of the capital, save what was involved in the suppression of the monasteries and the conversion of the abbey of St. Mary's and the priory of All Hallows from religious to civil uses. The disturbed condition of Ireland throughout the whole Tudor period sufficiently engaged the attention of successive deputies from Poynings to Essex; and when the comparative calm that followed the Plantation of Ulster left leisure to such liberal-minded rulers as Chichester, St. John, and Falkland to contemplate the improvement of the capital, even the expenditure which was found to be indispensable to make Dublin Castle habitable was with difficulty sanctioned by the parsimony of James I. Such extensions of the city as took place in the early years of the seventeenth century lay in a south-easterly direction, some part of the empty space between Dublin Castle and Trinity College being appropriated to Chichester House; but no attempt was made to enlarge the bounds of the metropolis to the west, where on the north the meadows and green of Oxmantown lost themselves in the vague hinterland of Grangegorman, and on the south fresh meadows running down to the banks of the Liffey extended from James'-street to the old priory of Kilmainham.

The all-pervading energy of Strafford would probably have embraced the beautifying of the capital had time and fate permitted.

His letters are not without evidence that the subject was in his thoughts. But the dread Viceroy passed to his doom on Tower Hill, leaving no visible memorial nearer Dublin of his long tenure of uncontrolled authority than the crumbling walls of the unfinished edifice near the Naas road. After Strafford's departure ensued the terrible epoch that followed the Rebellion of 1641.

" Fire and sword
Red ruin and breaking up of laws"

laid hold of Ireland for a full decade, and the war and waste which devastated the whole country nowhere left ruder traces than in the streets and fortifications of Dublin and the fortunes of its hapless citizens. It is difficult to picture a scene of greater desolation, indigence, and even famine than is painted in the letters of the Irish Lords Justices in the years immediately following the rebellion and in those of the Viceroy, afterwards the first Duke of Ormond,¹ in the disastrous years that preceded his abandonment of Ireland to the Roundheads. The decade 1651 to 1660 was one of less disturbance; but a military Government seldom encourages municipal prosperity, and the general sense of the insecurity of the Cromwellian *régime* was unfavourable to private enterprise. Thus it was not until the Restoration that any effort was made to rescue the city from the decay into which it had fallen. Then, indeed, was witnessed a marvellous change.

In the year 1661 the Duke of Ormond, sharing the happier fortunes of the cause to which he had clung in adversity, and returned from exile with his master, was appointed Lord Lieutenant of Ireland, or, to use the picturesque phrase of the time, "came to the sword." A great nobleman, possessed of a stake in the country greater than that of any other subject of the Crown, Ormond was in the fullest sense a resident viceroy. Having held the sword in the evil days of rebellion and civil war, he knew, as no one else could, all that the country and the capital had suffered, and he returned to Ireland animated with a desire to do all that in him lay to give back prosperity to both. How far he succeeded in the political sphere in fulfilling expectations of which, as he remarked, it would have required another and a larger Ireland to satisfy them all, it is not our present business to discuss, but of the efficacy of his plan for the renovation of Dublin there can be no sort of question. If the exile of the Royalists to Paris, Brussels,

¹ Letters of the Irish Lord Justices. Ormonde MS.

Amsterdam, and wherever else the scattered followers of Charles II. found a refuge in Continental centres did nothing else for them, adversity was not without its uses in enlarging their experience of men and cities. Ormond and his adherents returned with new and liberal ideas of what a capital ought to be, and to these they speedily gave effect. Houses everywhere sprang up without the walls of Dublin. The space from Cork-hill to College Green was largely filled up. Oxmantown Green became so built upon that, in less than eight years, Ormond was obliged to requisition St. Stephen's Green, then lately walled in, as an exercise ground for his garrison, and the northern quays began to be formed as we now know them.¹ So rapid was the extension that the citizens, mindful of their past troubles, called the attention of the Viceroy to the difficulties likely to be occasioned in time of war by reason of the large number of dwellings which now lay without the fortifications; and the Earl of Essex,² one of Ormond's successors in the Viceroyalty, writing in 1673, observes that "the city of Dublin is now very near, if not altogether, twice as big as it was at His Majesty's restoration, and did, till the Dutch war began, every day increase in building." But of all the adornments and additions then planned and accomplished by far the greatest was the formation and enclosure of "His Majesty's Park of the Phoenix," of the origin and history whereof it is the object of this paper to give some account.

Although the Phoenix Park, as it now is, and as it has been known to the citizens of Dublin for above two centuries, has for its southern boundary the road running by the north bank of the Liffey from Dublin to Chapelizod, it originally embraced both sides of the river and included the land on which the Royal Hospital, Kilmainham, now stands. Here it was that the Duke of Ormond found the nucleus of the Park. At the time of his return from exile the lands of Kilmainham had been for exactly a century in the undisturbed possession of the Crown. Originally granted by Strongbow to the Knights Templars in 1174, they had become, on the suppression of that Order by Edward II., the appanage of what Ware calls "the most noble priory of St. John's of Jerusalem in Ireland";³ but had been surrendered to Henry VIII. in the thirty-third year of that monarch's

¹ See the Description of England and Ireland by Mons. Jorevin de Rocheford Paris, 1672, a translation of which appeared in "The Antiquarian Repertory," vol. ii., published in London in 1779, where the writer, in describing Dublin in about the year 1666, says "the finest palaces in Dublin are along the Quay near Oxmantown."

² Essex Papers, Camden Soc., New Series, vol. 47.

³ Ware's Annals, p. 259.

reign by the then prior, Sir John Rawson. The Hospital and its lands remained in the possession of the Crown from 1542 onwards during the reigns of Edward VI. and Queen Mary, and the priory appears even thus early to have been utilised as a Viceregal residence. In Ware's "*Annals*"¹ the Lord Deputy, Thomas Radclyffe Viscount Fitzwalter, is described as marching in 1557 with his forces "from the Hall of Kilmainham, being the Lord Lieutenant's place of retire." But at the close of the same year the priory was restored by Queen Mary, at the instance of Cardinal Pole, to the Knights of St. John, one Oswald Massingberd being installed as prior. Massingberd's tenure was necessarily brief. On the accession of Elizabeth in the year following he fled over seas, and Fitzwalter, returning to the Viceroyalty as Earl of Sussex, resumed possession of the priory. Thereupon it was found expedient to settle the title of the Crown on a clear basis, and accordingly by "An Act for the restitution of the late priory or hospital of St. John's of Jerusalem" the house and lands were declared to be "annexed to the Imperial Crown of this realm² in the Queen's most royal person" in as full a manner as before the patent to Sir Oswald Massingberd.

The priory, or as it now began to be called, the castle of Kilmainham, having considerably decayed since the original suppression of the Knights of St. John by Henry VIII.,³ Elizabeth, deeming it a fit place for the residence of the Chief Governors of Ireland, gave order for its repair, and for the next thirty years it was so used by successive deputies from Sir Henry Sidney to Sir William Fitzwilliam, though the former, on his first arrival, finding the repairs inadequate, was obliged to take refuge in the archiepiscopal palace of St. Sepulchre's.⁴ But after Fitzwilliam's departure in 1588, the hall or principal building was suffered to fall into woeful dilapidation, whilst its appurtenant premises had already degenerated into hopeless ruin. A memorandum drawn up in 1572 of "the decays of the Manor place of Kilmainham,⁵ and of the mills and weirs there," shows the extent to which decay had even then spread: St. John's Church being roofless, St. Mary's chapel being utilised as a stable and its steeple broken down, and the fort by which the whole was defended presenting a complete wreck. The mills and weirs of Kilmainham had also fallen into ruin,

¹ Ware's *Annals*, p. 142.

² Statute, 2 Elizabeth, Cap. 7.

³ M.S. *Annals of Dudley Loftus* in Archbishop Marsh's Library.

⁴ Cal. Irish State Papers, 1569-1573.

⁵ *Decays of the Manor Place of Kilmainham*, Irish State Papers. 1572. Record Office.

"the pound by which the waters of a swift-running river named the Liffey" had course to the former having two great breaches or gaps in it, and the weirs "for the taking of samon" urgently needing repair. But sorry as was the spectacle thus presented by Her Majesty's House of Kilmainham, no attention whatever was paid by Elizabeth to the frequent remonstrances of her representatives in Ireland at the neglect of the place. After Fitzwilliam's departure, the ancient priory was degraded to a granary, though many years were still to elapse ere it ceased to be officially regarded as a possible Viceregal habitation. In 1599, when the favourite Essex was about to come over on the luckless mission which was to lead him to the scaffold, orders were given for the putting in readiness of Her Majesty's House of Kilmainham for the Lord Lieutenant's reception; but a sum of £153, expended by the Lords Justices in repairs pursuant to this order, incurred the disapproval of the Treasury, who endorsed the item in the accounts "a house of pleasure without Dublin, and therefore a superfluous charge."¹

The later Elizabethan viceroys, exercising their office for the most part through Lords Justices, were little inconvenienced by the loss of the only official residence outside Dublin Castle. But early in the reign of James I. that vigorous administrator Sir Arthur Chichester, who was Lord Deputy for twelve years, of which eight were spent in Ireland, did his best to get the place put into order. In 1605, he applied for "£1000 harpe, making £750 sterling for the repair of the house at Kilmainham, as a residence for the Lord Deputy in the summer months, when the castle is somewhat noisome by reason of the prison." Four years later he was obliged to name £3000 as the sum necessary, describing the place as "a goodly vast building, but like to be utterly ruined and blown down the next winter." Chichester plaintively added that he made this representation only in discharge of his duty, "Kilmainham being His Majesty's only house in this kingdom meet for the deputy to reside in," but not expecting that any attention would be paid to his remonstrance.

It being plain that King James and his ministers cared nothing for the place, and were only desirous of getting rid of the cost of keeping it from further dilapidation, divers of his officers in Ireland began to set covetous eyes on Kilmainham, and memorials were addressed to the king pointing out its ruinous condition, and the valuelessness of the lands attached to it, and expressing a loyal readiness to relieve the

¹ Cal. Irish State Papers, 1599-1600.

Crown of the whole. In 1609, Sir Richard Sutton,¹ His Majesty's Auditor of Imprests, proposed to take a grant of all the lands on the north side of the Liffey in fee-farm for ever, with a reservation of only £20 a-year to the Crown, in consideration of his surrender of certain lands in Cornwall. A King's letter directing a patent to issue was accordingly sent over to Chichester, from whom it drew a vigorous protest. The Lord Deputy suspended the grant till his objections could be considered by the Privy Council, pointing out the desirability of restoring the house as a Viceregal residence, and observing that if the lands were alienated the deputies would be "without any place either of pleasure or help towards housekeeping." He concluded by expressing his opinion, that if the grant should be made the Crown would ere long be coerced either to largely increase the Viceregal allowances or to buy back Kilmainham. Chichester's protest, however, fell on deaf ears. In the following year the patent issued to Sutton, and the Deputy, despairing of procuring its revocation, proposed to build an official country seat at Drogheda. The priory of Kilmainham was left derelict. No attempt was ever thereafter made to restore the building, of which half a century later little or nothing remained. In the Down Survey, the remnants are described as the ruins of a large castle; and, when in 1680 directions were given to clear the site for the erection of the Royal Hospital, there only remained part of the walls of the chapel, the stones whereof were carefully taken down and used in building the chapel of the Hospital.

But the disappointed deputy had not to wait long for the fulfilment of his prophesy. Sir Richard Sutton never took possession of the lands of Kilmainham, assigning his grant in 1611 to Sir Edward Fisher, to whom, in the same year, a fresh grant was issued confirming his title to all the lands on the north side of the Liffey and Kilmainham bridge, extending from Oxmantown green to Chapelizod and to the river Liffey, and including 330 acres, part of the demesne of the late hospital of Kilmainham, and 60 acres known as Kilmainham Wood. On the property thus granted, Fisher, who acquired at the same time the sole right of fishing in the Liffey, erected a country house; but, in 1618, he surrendered his patent to the King² for a sum of £2500, whereupon the lands, with the house thereon, were by special direction of the King converted to the use of the Chief Governor of Ireland for the time being.

¹ Cal. Irish State Papers, 1608-10.

² Roll of James I., pt. 2.

This repurchase of the lands of Kilmainham was effected by Sir Oliver St. John, afterwards Lord Grandison, who in 1616 had succeeded Chichester as Deputy, and who, almost immediately after Fisher's surrender, took up his abode at "His Majesty's House at Kilmainham called the Phenix."¹ The house is first described by that name in an order for payment of moneys disbursed in repairs in February, 1619, and thenceforward it is constantly used. With respect to the origin and derivation of this name, I cannot presume to meddle in Gaelic etymology; but I understand that there is no reason to question the explanation offered by our local historians and expanded by Dr. Joyce, which refers the name to a corruption of the word *Fionn* (or *Phion*) *uisg*" signifying 'clear' or 'limpid water,' and denoting a spring well of singular transparency situate within the park.²

It was in the time of St. John's successor, the first Lord Falkland, that the notion, not carried out till forty years later, of turning the lands into a deer park, seems to have been first entertained. In 1623 a king's letter directed that one William Moore should be employed about His Majesty's park, which was to be enclosed near Dublin for the breeding of deer and the maintenance of game. But although the office of Master of the Hawks and Game had been constituted in 1605, and was at the time held by the Vice-Treasurer, Sir Thomas Ridgeway, afterwards Earl of Londonderry, it does not appear that anything was done to enclose any part of the lands of the Phoenix or to stock it with game. At any rate no new Master was appointed on Ridgeway's death in 1631.

For forty years from the time of its acquisition by the Crown "the House of the Phoenix" remained the principal residence of the rulers of Ireland and their favourite resort. Strafford and Ormond, Fleetwood and Henry Cromwell, were among its successive occupants in the thirty troubled years that preceded the Restoration. Situated on the eminence now occupied by the magazine fort, commanding the fine prospect of the Dublin hills and of the valley of the Liffey in one direction, and a far stretching expanse of almost entirely unoccupied land in another, it was an almost ideal spot for the recreation of jaded

¹ Irish State Papers, Cal. 1615-1625.

² "Irish Names of Places," vol. i., p. 24.

³ The writer of this paper is not satisfied that Dr. Joyce is correct in fixing the site of this spring as close to the Phoenix Pillar and the entrance to the Viceregal grounds. It is submitted that the spring at that spot, would not have been on the lands originally held with the Phoenix house. It seems more probable that the name derives from a spring in the vicinity of the Magazine.

statesmen in the intervals that great affairs afforded. Here Strafford, in the earlier years of his rule, diverted himself with hawking, or with such substitute for his favourite sport as he was forced to improvise in a country seat in which, as he laments to his friend Cottington,¹ "there hath not been a partridge within the memory of man." "Tomorrow," he writes, "I purpose with a cast or two of spar-hawks to take myself to fly at blackbirds, ever and anon taking them on the pates with a trench. It is excellent sport, there being sometimes two hundred horse on the field looking on at us." On Ormond's surrender of Dublin to the Parliament in 1647, the Phoenix passed into the hands of the Parliamentarians, but on the Viceroy's return in June, 1649, when he lay before Dublin prior to the disastrous battle of Rathmines, he summoned the House to surrender, and it was delivered up, but only to be reoccupied a few weeks later by the victorious forces of the Parliamentary General, Michael Jones.² In 1652 Sir Hierome Sankey, one of the greediest of the Cromwellians, seems to have secured a promise of the place, and a survey of the manor of Kilmainham was ordered by the Parliamentary Commissioners; but it does not appear how far this affair proceeded.³ Later, the Phoenix was the constant abode of Henry Cromwell, many of whose letters are dated from thence. He appears to have been fond of the place and added considerably to the building, which, even before his improvements, was described by Sir William Petty as a very stately house and in good repair.⁴ Ormond, on being reinstated as Viceroy, gave order for the building of a hall and stables; and Lord Orrery,⁵ who, as one of the Lord Justices, pending Ormond's arrival, had charge of the improvements, suggested the addition of a chapel; but, except as to the stables, these designs were not proceeded with, the larger schemes involved in the formation of the Park rendering them in part unnecessary.

We have now reached the time of the making of the Park, but before proceeding with the story it may be convenient to trace the subsequent history of the old Phoenix House. The Duke of Ormond was the last Viceroy to utilise the place as a residence, and his occupation must have terminated about 1665, when the Viceregal seat was moved, as will shortly be seen, to Chapelizod; but the gardens and stables were maintained for many years. The house itself seems to

¹ "Strafford Letters," vol. i., p. 162.

² Letter of Arthur Blackwell from Dublin, July 11, 1649, *Carte Papers*, 25, 35.

³ Harding, "On Surveys in Ireland," *Trans. R.I.A.*

⁴ Orrery's "State Letters," vol. i., p. 62; *Down Survey*.

⁵ Orrery's "State Letters," vol. i., p. 62.

have been given up to members of the Lord Lieutenant's staff, and in 1719 was in the occupation of an official called the Gentleman of the Horse.¹ It was still standing when, in 1734, the Duke of Dorset directed the provision of a powder magazine in such part of the Phoenix Park as might seem most proper for the purpose, and the Lords Justices, with that carelessness of historical associations by which the eighteenth century is unhappily distinguished, having fixed on the ground occupied by the old Phoenix House and stables as the most suitable spot, the Viceroy gave orders for the demolition of the buildings. Thus the handsome Jacobean mansion became a thing of the past, and the magazine and fort, whose erection evoked the last satiric spark emitted by Swift's expiring intellect, has ever since occupied the site of His Majesty's House of the Phoenix.²

The Duke of Ormond was appointed Lord Lieutenant in November of 1661, the administration having been previously confided to Lords Justices. But the interminable difficulties besetting the impossible task of devising an act of settlement which should reconcile the contending claims of the successive grantees of the forfeited lands of Ireland delayed his arrival in Ireland until the following July. Immediately on his appointment Ormond communicated with Sir Maurice Eustace, the Irish Chancellor and one of the Lords Justices, as to the most fitting place for the Viceregal abode, and Eustace recommending the Phoenix as a pleasant summer dwelling-house, which, moreover, was in the near neighbourhood of his own seat at Chapelizod, the Viceroy gave directions for its enlargement, and on his arrival took up his residence there.³

Pre-occupied with weightier matters, Ormond's correspondence in 1662 throws no light on the circumstances in which the project for forming the Park originated, but there can be little doubt that it was in the neighbourly intercourse between Viceroy and Chancellor that the suggestion of a deer-park near the Viceregal residence was first mooted. Eustace had already spent a long life mostly in official harness. Appointed Speaker of the Irish House of Commons, with the approval of Strafford, in 1634, he had the address to hold that office through the stormy times that followed until the advent of Cromwell involved him in misfortunes which culminated in a seven

¹ Estimate of repairs, Oct. 7, 1719, British Departmental Corr., Irish Record Office.

² Duke of Dorset to the Lords Justices, 8th Oct., 1734, Irish Record Office.

³ Orrery's "State Letters," vol. i., p. 62.

years' captivity at Chester. Liberated in 1658 Eustace returned to Ireland, but was forbidden the exercise of his profession at the bar, at which, prior to these troubles, he had reached the rank of Prime Serjeant, and, at the Restoration, his sufferings were held to have earned his advancement to the highest judicial office in Ireland.' Eustace was old enough to remember the unfulfilled plans of Falkland for the enclosure of the Crown lands of Kilmainham, and Ormond, full of schemes for the improvement of Dublin, had a ready ally in a Chancellor whose own seat at Harristown was reckoned among the stateliest homes in Ireland. It is, perhaps, doing the old gentleman no injustice to surmise that his satisfaction in the laying out of His Majesty's deer-park was not diminished by the circumstances that the scheme could not be effectually carried out without his own consent and co-operation, and that it presented an opportunity for the advantageous disposal of his property at Chapelizod. Be this as it may, it is certain that the first official mention of the Phoenix Park occurs in a King's letter, dated December 1st, 1662, directed to the Lord Lieutenant, which ratifies the purchase from Eustace of 441 acres contiguous to the Phoenix demesne, being part of the manor or lordship of Chapelizod, which the Chancellor had recently acquired.¹

The original extent of the Crown lands held with the Manor House of the Phoenix cannot have been much above four hundred acres. But by an agreement entered into at the same time as the arrangement with Eustace about a hundred acres lying to the north-west of the Phoenix demesne, and known as the lands of Newtown, were acquired for a sum of £3000.² This purchase was not completed until 1671, but the lands, which included the site of the present Viceregal Lodge, were at once taken over and walled in. Thus the Park, as at first contemplated, comprised little more than a thousand acres. This was speedily found to be insufficient, and in May, 1663, a further king's letter³ authorised the purchase from Eustace of "the whole manor and house of Chapelizard with the town and lands thereunto belonging, amounting in the whole to 590 acres with several other lands which be most convenient to enclose in a park." The purchase-money was fixed at a maximum of £10,000, the precise sum being left to arbitration. By the same authority the Lord Lieutenant was further directed

¹ For a detailed notice of Sir Maurice Eustace, see "Some Notes on the Irish Judiciary in the reign of Charles II.," by Francis Elrington Ball.

² Ormonde MS.

³ Howard's "Exchequer and Revenue of Ireland," vol. ii., p. 261.

⁴ King's Letter, 23rd May, 1663. Ormonde MS.

“to enclose or impark with a stone wall, in such manner as you have already begun, such lands of our ancient inheritance or new purchase as you shall think fit for that use, and to store the same with deer.”

Pursuant to these instructions, lands were accordingly acquired from various persons in Grangegorman and Castleknock; but it was soon evident that the Park was likely to prove much more costly than had been anticipated. Chapelized alone absorbed the whole of the original £10,000,¹ a sum much in excess of its value, if, as Lord Essex subsequently reported, the lands had never been worth more than £330 a-year in the best times.² By 1665 it had become necessary to provide a further sum of £10,000 to satisfy the other proprietors. Between 1665 and 1669 there were several further purchases, of which the most considerable was the acquisition at a cost of £2270 of the lands of Ashtown with the castle thereon, being the site of the lodge and grounds now occupied by the Under-Secretary. An account presented in 1669 of the expenditure in respect of the Phoenix Park shows an actual outlay at that date of upwards of £18,000 and a liability of £12,000, making a total of above £31,000.³ Provision was made accordingly; but even this large amount did not suffice, the total cost ultimately exceeding £40,000.⁴

As a result of these various additions, the area enclosed in the Park, inclusive of Kilmainham, amounted to above 2000 acres, or considerably more than its present extent. Ormond had meanwhile lost no time in proceeding with his plans. A contract was entered into for building the wall, which was speedily, if not very effectually, carried out. The lands on both sides of the river were enclosed by a stone wall which ran down to the river at each side at a point just west of the covered portion of the modern Kingsbridge Station. Those on the south bank of the Liffey embraced the whole space now comprised in the grounds of the Royal Hospital, the boundary running southwards from the Liffey by the present Military-road, turning westward near Bow-bridge, and following the course of Kilmainham-lane as far as St. John's-road, whence it ran northwards again to Island-bridge.

The contract for building the Park wall was given to one Dodson. Many of the accounts of this worthy are extant, together with the reports of the officials to whom they were referred by the Irish Privy

¹ King's Letter, 11th May, 1665, Ormonde MS.

² Christie's "Life of Shaftesbury," vol. ii., App., p. 53.

³ Account of Moneys paid for land in Phoenix Park, Ormonde MS.

⁴ "Exshaw's Magazine," 1775, p. 213, and "Freeman's Journal," Feb. 7, 1775.

Council. They make decidedly piquant reading, and suffice to prove that our much-abused Board of Works is after all an improvement on seventeenth-century methods. Dodson for years enjoyed a free hand and a most desirable job. His original estimate amounted to above £4000, and specified a wall 10 feet high and 2 feet 6 inches thick. This, one would suppose, should have provided a sufficiently secure enclosure; and by 1667 Dodson had executed without demur by the Paymaster, work to the nominal value of £6000. He was injudicious enough, however, to demand a hundred a year for keeping his own work in repair. This led to investigation. A committee of inquiry reported that the £6000 expended should have sufficed to erect a wall sufficiently durable to obviate such early need of repair, and certified that the walls were for the most part so badly executed that they could not be repaired without being taken down and relaid, defects which they attributed as well to the badness of the material as to the incompetence of the workmen employed, and which could scarcely be surprising if, as reported by the committee, Dodson had agreed with his sub-contractors to do for £30 that for which he was being paid £100.¹

As erected by Dodson, the wall, following the exact bounds of the lands, ran in a somewhat irregular course, following on the north the old Castleknock road, and embracing on the south the meadows by the Liffey on which the Kingsbridge Terminus now stands.² In 1671 it was resolved to straighten the walls, and several small lots on each side of the river, inclusive of these meadows and amounting to some six acres, were left out. As thus modified, the Park remained unchanged for the next ten years, until, in consequence of the assignment by the king of sixty-four acres on the south side for the use of the newly-founded Royal Hospital, the whole of the lands lying south of the Liffey were alienated from the Park. Advantage was taken of this circumstance to obviate the inconvenience caused by the public road to Chapelizod running through the Park, an arrangement which, coupled with Dodson's sorry boundary walls, had been found to lead to the frequent injury and loss of the deer. It was accordingly determined to limit the Park to the lands on the north side of the Liffey, taking the Chapelizod road as the boundary. Dodson being by this time discredited, it was necessary to find a fresh contractor, and for the construction of the new wall a curious arrangement was

¹ Report of Sir Wm. Flower and others, Oct. 27, 1668, Ormonde MSS.

² A Survey of part of Newtown and Kilmainham left out of Phoenix Park, Irish Record Office.

entered into with a public servant of high distinction. Sir John Temple, who held the office of Solicitor-General from the Restoration to the Revolution, had inherited from his father, the well-known author of a history of the Rebellion, and long the Master of the Rolls in Ireland, large interests in the neighbourhood of the Park which he was desirous of increasing. He now added to his eminent legal functions the rôle of builder and contractor, and undertook to build a wall eight feet high from the Park Gate to Chapelizod in consideration of the sum of £200, and a grant of the lands thus omitted from the Park between the road and the river. The contract was duly carried out. The Park assumed the shape it has ever since substantially retained,¹ and the strip of land lying along the river bank from Kingsbridge to Chapelizod was added to the possessions of the Temples of Palmerstown.

Meantime neither the delinquencies of Dodson nor the subsequent alteration in the scope of the Park had been allowed to delay the equipment of the lands as a deer park. Deer were brought from England; and Marcus Trevor, Viscount Dungannon, who had already received a patent as Master of His Majesty's Game and Parks in Ireland, was designated as Ranger in 1668. Two keepers were at the same time appointed. There appears also to have been an intention to create an office higher than either of these, that of Lieutenant of the Park, which was intended by Ormond to be held by his son, the gifted Earl of Ossory, in conjunction with the house at Chapelizod acquired from Sir Maurice Eustace.² This idea, which was taken from the constitution of the Royal Park at Woodstock, as well as a proposed designation of the Park as Kingsborough Park, was abandoned, and the offices created were confined to those of the Ranger, who was also keeper of the walk of Newtown, with a residence on the site of the present Viceregal Lodge, and of two keepers, one for what was called Kilmainham walk, and the other for the lodge and walk of Ashtown. The Kilmainham keepership was apparently abolished when the lands south of the Liffey were assigned to the Royal Hospital. But another was established at Castleknock Gate, with a residence on the site of Mountjoy Barracks. The separate establishment of Ranger and

¹ So far as the writer is aware, no alteration in the line of the boundary walls took place from the erection of Temple's Wall until 1786, when the limits of the Park were slightly curtailed at the Eastern boundary, near Park Gate, to enable the Wide Street Commissioners to widen the road leading from Barrack-street to Island Bridge.

² Draft King's Letter to Attorney-General, Ormonde MSS., undated.

keeper lasted far into the eighteenth century; the last to hold the Rangership as a separate office being Nathaniel Clements, the builder of the Viceregal Lodge. In 1785 the two offices were amalgamated in the person of Sackville Hamilton, then Under-Secretary, and thenceforward were held for many years together with the Lodge of Ashtown, by the Under-Secretary for the time being. This latter arrangement lasted without interruption down to 1830, when the control of the Park was handed over to the Commissioners of Woods and Forests,¹ the predecessors of the Board of Works. Ten years later, on the death of Thomas Drummond, who was the last Under-Secretary to hold the position, the office of Ranger of the Phoenix Park was finally abolished.² But the charming residence in the Park, formerly Ashtown Castle, and certain delectable perquisites in the shape of venison from the Park preserves, survive to remind the present occupant of the ancient glories of his office.

A public improvement on a scale so magnificent naturally attracted attention, and the opulent possibilities of a demesne so close to the capital to which Ormond had successfully attracted the Irish nobility as a place of residence soon excited the cupidity of the rapacious favourites who thronged the Court of St. James. Ormond, entangled in the same web of intrigue which had procured the disgrace of his old friend Clarendon, was removed from his post in 1668, and, with the withdrawal of his authority, the future of the Park he had been at such pains to form, was soon endangered.³ It was first promised to the ill-starred Duke of Monmouth, who, however, withdrew his request for it in deference to the remonstrances evoked from Ireland by the proposal. But ere long the Park became the subject of a more serious intrigue. On the death of Lord Dungannon in 1672, the Rangership was bestowed on Sir Henry, afterwards Lord Brouncker, a Court favourite with a shady reputation, whose sufficient epitaph is an unsavoury paragraph in Pepys's Diary, but who should be mentioned with charity in any learned assembly as the brother of the first President of the Royal Society. Brouncker belonged to the section of Charles the Second's Court which, before she had been superseded in the royal graces by younger rivals, revolved in the brilliant orbit of Barbara Villiers, Duchess of Cleveland. To her the new Ranger

¹ Statute 10 Geo. IV., cap. 50.

² Letter from Commissioners of Woods, etc., to Lord Morpeth, Irish State Paper Office. The writer has to thank Sir David Harrel for this reference.

³ "Essex Papers," vol. i. p. 59.

suggested that a grant of the Phoenix Park would be a fruitful source of enrichment, and this was readily accorded by the easy sovereign. Instructions to pass the patent were sent to Lord Essex, who had shortly before entered on a Viceroyalty still commemorated in Dublin by Capel-street and till recently by Essex-bridge. His action on the occasion was worthy of a statesman who has left a name among the most honourable of his day. Like Chichester sixty-six years earlier, in the case of Sir Richard Sutton, he suspended the patent till the king could be brought to consider his objections; and he wrote energetically to Arlington, Shaftesbury, Godolphin, and other ministers, desiring them to exert their influence to procure a revocation of the grant. The duchess, however, though past the zenith of her charms, still retained much of her influence with Charles, and not many were willing to peril their own positions by thwarting so powerful a personage. It took two months of incessant remonstrance to prevail with the king to cancel his gift, and even then only upon a promise that lands to the value of £1000 a year should be found for the disappointed lady.¹ Essex was much assisted in his representations by the Duke of Ormond, who was keenly desirous of preserving the Park to the Crown and the capital, and it was on this occasion that he met the angry and unmannerly reproaches of the Duchess of Cleveland with the admirable example of the retort-courteous recorded by Carte.² Meeting the duke at court her grace publicly upbraided Ormond with his opposition to her interests, concluding an animated tirade with the expression of her hope that she might live to see him hanged. To all which Ormond, having heard the frail beauty out, only replied that he was not in so much haste to put an end to her Grace's days, for all he wished in regard to her was that he might live to see her old.³

We have already seen that the lands acquired from Sir Maurice Eustace included the mansion-house of Chapelizod, which had been occupied for some time by the Chancellor as his residence. How Eustace had become possessed of this property does not precisely appear, but in 1657 the house had been in the occupation of Col. Theophilus Jones, a soldier who, alike under protectorate and monarchy, succeeded in securing his full share of the good things that were going in an era of confiscation. Jones had, however, incurred the suspicion of the Parliamentary leaders in 1659, and had quitted Dublin for a time, and it was

¹ Essex Letters from Ireland in 1676.

² The date—1664—assigned by Carte to this incident is manifestly incorrect.

³ Carte's "Life of Ormonde," vol. ii., p. 153.

probably from David Edwards, who appears in the Census of 1659 as among the three "tituladoes" for Chapelizod, that Eustace had purchased it in the following year. The house with its garden stood between the river and the Chapelizod road, a little beyond the present Roman Catholic church, and the green meadows margined by a few decaying remnants of formerly abundant timber which run down to the north bank of the Liffey, a little westward of the new Boat Club premises on the opposite side, still reveal to a careful survey some traces of their former stateliness. When first taken over by Ormond, the house and grounds lay within the Park, and, though excluded from its precincts by Sir John Temple's wall, they were excepted from the grant of severed land by which Temple was remunerated, and preserved as the viceregal residence, a character which they retained for a full century from their first acquisition by the Crown.

Here a succession of Viceroys and Deputies, including Ormond himself, his sons, Lords Ossory and Arran,¹ Essex, Clarendon, and Tyrconnell, constantly resided down to the Revolution; and though the straitened finances of the times could not afford any large expenditure on the place, the King's House was evidently regarded by its tenants as a desirable abode. Essex, in the correspondence already referred to, dwells with animation on the importance of the Park residence as an alternative to the unwholesomeness of the Castle, and from the correspondence of Henry Lord Clarendon, who preceded Tyrconnell as Viceroy, some idea of its character may be gleaned. Both Clarendon and his wife were correspondents of the accomplished Evelyn. The Countess—"a blue who looked like a madwoman and talked like a scholar"—writes to the author of "*Sylva*," lamenting her coming to a country which he had not cultivated, but with evident enjoyment of her surroundings, though she deplored a deficiency of trees and shrubs. Clarendon himself describes to the same friend the fertility of the extensive kitchen gardens attached to the place, dwelling with the gusto of a gourmand on the excellence of the asparagus. Clarendon was followed at Chapelizod by Tyrconnell, who lay ill there before joining James II. in the decisive struggle for the Crown of the Three Kingdoms, and the next occupant of "the King's House" was the victor of the Boyne. William III., the only Sovereign prior to George IV. who at any time dwelt in any of the residences attached to the Park, came to Chapelizod at the end of the stirring month which

¹ Lord Arran's first wife, Lady Mary Stewart, died at the King's House, July 4, 1668.

witnessed the defeat of his rival, and three royal proclamations, one of them ordaining a day of humiliation and prayer "for the future progress of our arms and a speedy enjoyment of peace and quietness in the land," are dated from "Our Court at Chapelizod."¹

After William's departure the King's House continued to be utilized by his representatives; but from the death of Henry, Lord Capel, which unfortunately occurred there in 1701, the place seems to have had no attraction for succeeding Governors. The Viceroy of the eighteenth century were, in any case, for the most part absentees, and from the accession of George I. it does not appear that many of them resided at Chapelizod. Deserted by the Viceroy, the house was given over to the Lord Justices and was allowed to fall into considerable decay. But the Duke of Grafton and Lord Galway, who governed Ireland as Lord Justices in the Vice-royalty of the Duke of Shrewsbury, effected some improvements. Lord Galway erected a pigeon-house which still stands in the grounds. Primate Boulter,² who obtained leave from Lord Carteret to occupy the place, made some attempt towards restoring it in 1726, and for some years the King's House seems to have recovered its former glory. The Duke of Dorset, whose Court was of exceptional brilliancy, resided there in 1731, and it is at this date that we find the entertaining Mrs. Delany, then Mrs. Pendarves, describing the attractions of the Park with her usual sprightliness. "It is," she writes, "a large extent of ground, very fine turf, agreeable prospects, and a delightful wood, in the midst of which is a ring where the beaux and belles resort in fair weather. Indeed, I never saw a spot of ground more to my taste: it is far beyond St. James's or Hyde Park."³ The ring referred to was the open space in which the Phoenix Column now stands, and was at that time entirely, as it is still in part, surrounded by trees. The latest reference to the King's House as an official residence occurs in another letter from the same accomplished lady, who in May, 1750, dined at Chapelizod, "a sweet place, about two miles from Dublin, belonging to the Government," and lent to William Barnard, the Bishop of Derry, who doubtless owed the privilege to his connexion with the most eminent of the then Lord Justices, the masterful Primate Stone. In 1743 the house was put in order for the reception of Lord Chesterfield, but that nobleman, though he greatly admired the Park and exerted

¹ Hist. MSS. Comm : Report on Ormonde MSS., vol. ii., 1899.

² Primate Boulter's Letters, i., pp. 116-122; ii., pp. 139, 140.

³ Correspondence of Mrs. Delany, vol. i., p. 294, and vol. v., p. 547.

himself to improve it, seems to have resided at the Castle during his visits to Dublin.

From this time forward the place ceased to be valued except for the extensive gardens attached to it, which were abundantly stocked with fruit-trees and vegetables. The house fell year by year into ever-increasing decay; and the State records contain many piteous appeals from its custodian for the execution of the repairs necessary to prevent absolute dilapidation.¹ Ultimately, on the arrival of the Duke of Bedford in 1758, it was determined to dispense with the residence, and the King's House was two years later given over to His Majesty's Regiment of Artillery as quarters for the officers of that corps. As such it continued to be utilized for the next sixty years or so, and readers of Le Fanu's tale of "The House by the Churchyard" will remember references to the King's House in this capacity. In 1832 the place with its adjoining ground was sold by the Government, and thenceforward the very name of the King's House was lost save as a local tradition, though it is still retained on the maps of the Ordnance Survey. The building itself was destroyed by fire and replaced by a modern house, and only some outhouses, the pigeon-house already referred to, and an ornamental pond in the grounds, survive to mark the site of the last royal residence in Ireland.

Though Chapelizod as a residence began to go out of fashion with the opening of George the Second's reign, the Park, as a place of resort, continued popular, and efforts were made by more than one Lord Lieutenant to contribute to its improvement. In the public mind no name is so closely associated with the Phoenix Park as that of the Earl of Chesterfield, but curiously little evidence remains to attest his share in the improvement of the Park and the interest he undoubtedly took in it, beyond the substantial memorial which the Phoenix Pillar still affords, and in which he embalmed that misconception of the origin of the name of the Park which he was the first to consecrate with official authority. The tradition of the true origin of the name, already mentioned, was doubtless lost through the transference of the Viceregal seat from the Phoenix House to Chapelizod, and the non-residence of the Viceroys for a long period. The Irish Court of the first half of the eighteenth century knew little and, if possible, cared less about Irish etymology, and the confusion of the name with the mythical bird was a natural one in a nobleman who affected a classical elegance in his correspondence. Even before Chester-

¹ British Departmental Corr., Irish Record Office.

field's time, Mrs. Delany, in the letter already quoted, displayed the same misapprehension of the meaning of the name, and wrote of "the Park, justly called the Phoenix," as though the title had been chosen in boastful assertion of the superiority of the Park to all other places of the kind. Lord Chesterfield undoubtedly did a good deal to improve the appearance of the Park by judicious planting, and greatly increased its utility to the citizens of Dublin by forming the central road from the Park gate to Castleknock, which was long known as, and still deserves to be denominated, Chesterfield Road. But neither his published letters nor those still extant in manuscript in the Newcastle Papers at the British Museum contain any references to the improvements he effected.

For many years after the abandonment of the King's house the representatives of the Crown in Ireland remained without any official residence, and the improvidence which had surrendered Chapelizod must have been lamented by Lord Townshend and his successors when, in 1667, Chatham ordained that the King's Lieutenants should reside in Ireland. Townshend apparently entertained some idea of building a mansion in the Park, but did not remain in the Government long enough to give effect to it.¹ His successor, Lord Harcourt lived, at St. Wolfstan's near Lucan; and it was not until 1781 that steps were taken by the then Viceroy, Lord Carlisle, and his Chief Secretary, William Eden, afterwards Lord Auckland, towards acquiring the residences of the Park officials for the use of the Government. Of these there were then four; viz.: the lodges respectively belonging to the Ranger and the Bailiff, the Keeper, and Charles Gardiner, afterwards Lord Mountjoy. The third was then occupied, as already explained, by the Under-Secretary in his capacity of Keeper, while the fourth was in the possession of Gardiner, by whom it had been built, and who had retained it as private property after the surrender of a Patent as Keeper which he had obtained in 1756. The Ranger at this time was the Right Hon. Nathaniel Clements, father of the first Lord Leitrim, who, shortly after his appointment in 1751, had built on the site of the old lodge of Newtown, the present Viceregal Lodge. Negotiations for the acquisition of this house for the use of the Lord

¹ Just before this date the Hibernian School was founded. The original grant of land by the Crown in 1766, was "a piece of land, part of our Phoenix Park, next adjoining to our Garden at Chapelizod containing 3 acres Irish measure." But a year later, it being pointed out that the low situation selected was unwholesome, the present site of the School was granted instead.

Lieutenant were entered into in 1781, and in July of the following year were completed by the payment to Mr. Robert Clements of a sum of £10,000.¹

The Park appears to have been well cared for by the Ranger and other officials responsible for it down to the accession of George II.; and in the Irish departmental correspondence at the Record office down to that date are frequent references to expenditure on drainage and repairs to roads. A very considerable part of the Park, especially that in the neighbourhood of the Phoenix Pillar and Viceregal Lodge, is naturally of a very swampy and boggy character; and large sums were required to drain the surface and make the roads sound. In the middle of the eighteenth century much less attention seems to have been bestowed on these matters, and the soil relapsed, as boggy land is apt to do, to its original character. At the time when the Viceregal Lodge was acquired by the Government, deterioration had spread to a very serious extent. "The roads and surface of this Park continue in a damned state," wrote Eden to Sir John Blaquiere in 1781.² Owing, as the Chief Secretary complained, to the number of the "co-existing potentates of the Park," it was difficult to fix responsibility on anyone; so that between ranger, keeper and bailiff, what was everyone's business was nobody's business, and the due care of the place was scandalously neglected.³ In another letter, Eden called the bailiff's attention to the grievous results of their carelessness. "Two or three hundred tents," he wrote, "for the sale of whisky were permitted to be established in the beginning of last week, and are still standing in full vigour to the great detriment of the trees and turf, and the destruction of the cows, sheep and deer." It appears from other sources that Blaquiere had given disgracefully little attention to the proper keeping of the Park, and that in his anxiety to make a profit out of the right of grazing which was a part of his Patent he had greatly injured the deer.⁴

The Government appears to have quickly repented of its purchase of his Lodge; for it was no sooner acquired by Lord Carlisle than his successor, the Duke of Portland, sought to get rid of it, and the political circumstances of the moment suggested a graceful occasion for disposing of what the new Viceroy evidently regarded as a white

¹ Letter from Sackville Hamilton, July 13, 1782.

² Auckland MSS., Aug. 25, 1781; Addit. MS. Brit. Mus., 34, 418, f. 60.

³ June 6, 1681, Addit. MS. 34, 417.

⁴ Wm. Low to Nathaniel Clements, March 23, 1778, Brit. Dep. Corr., 1760-89, Irish Record Office.

elephant. It was proposed to present the Lodge and grounds to Henry Grattan, and thus to associate the Crown with the people in doing honour to the illustrious author of the legislative liberties which had just been conceded to Ireland.¹ Mr. Connolly was accordingly deputed to assure the House of Commons "that the Duke of Portland felt equally with the Irish people the high value of Mr. Grattan's services to Ireland, and that, as the highest proof he could give of his admiration and respect, the Lord Lieutenant begged to offer, as part of the intended grant to Mr. Grattan, the Vice-regal Palace in the Phoenix Park to be settled on Mr. Grattan and his heirs for ever as a suitable residence for so meritorious a person."

So flattering an offer, conveyed in a manner so gracious, as the gift of the King's only palace in Ireland, seemed likely for a moment to achieve the impossible and to unite the Government and people of Ireland in the person of Grattan. But it was only for a moment. It was soon discovered by the opposition that the Viceregal compliment was no better than a base attempt to divide the merit of the nation's gift to its liberator between the people and the ministry. As Sir Jonah Barrington puts it, "this magnificent and unexampled offer, at first view, appeared flattering and showy, at the second it appeared deceptive, and at the third inadmissible"; and the offer was eventually declined.²

The Lodge now known as the Chief Secretary's was acquired from Lord Blaquiére at the same time.³ It is the latest in date of the existing Lodges in the Park, and the circumstances in which it originated deserve to be noticed. The Patents of appointment of the Rangers and Keepers of the Park required the holders "faithfully and diligently to discharge and execute the office and trust of Keeper, and either in person or by some trusty servant, constantly to walk the round of the said Park."⁴ The patentees being gentlemen of position, invariably discharged their duties through a deputy known as the Bailiff. For this functionary a salary of £9, with living allowances and a small residence, was provided in the estimates, and his office became in time the subject of an eminently characteristic eighteenth-century job. On the death, in 1774, of one Crosthwaite, who had for many years filled the

¹ Sir Jonah Barrington's *Historic Memoirs of Ireland*, ii., p. 34.

² See also as to this episode Lecky's *History of England*, vol. iv., p. 559.

³ *Country Letters*, Irish Record Office.

⁴ Ormonde to Sir W. Flower. *Carte Papers*, Bodleian Library, May 28, 1664.

office of Bailiff, the well known politician, Sir John Blaquiere,¹ then Secretary in Lord Harcourt's administration, had procured for himself the appointment to this humble berth, and had, at the same time, obtained a lease of a plot of land adjacent to the Bailiff's lodge, which he proceeded to enclose, and on which a handsome house was thereupon erected at the public expense. Blaquiere being at the time unpopular, the job created a great outcry; and the Opposition fastening on the transaction as a convenient weapon for attacking the Government, the enclosure of the ground granted to Blaquiere was represented as an alienation to private aggrandisement of lands dedicated to the public use. Proceedings were taken to test his title,² and the Grand Jury of the County Dublin presented for the removal of the wall round the ground of the new Lodge "as an encroachment on the public and a nuisance to His Majesty's subjects, who have been accustomed to pass on horseback from time whereof the memory of man is not to the contrary." Thereupon the Crown was obliged to defend the exercise of the prerogative in the grant to Blaquiere, and application was made to the King's Bench to quash the presentment.³ The application was at first refused by the Court, but an issue being directed to ascertain the question of the title of the Crown, a trial at bar ensued at Green-street in which the circumstances under which the Park was formed were put in evidence; when the jury, finding in favour of the traverser, the character of the Park as the property of the Crown was established, and the presentment was quashed.⁴ Sir John Blaquiere remained in the enjoyment of the lodge until 1782, several years after he had ceased to be Secretary, when he was so fortunate as to receive £7000 from the Government, as the price of the surrender of a lease for three lives, under which he held the house which the State had built for him. Yelverton, who was one of the counsel in support of the presentment, made the capture by Blaquiere of the petty employment of Bailiff, the target for much legitimate ridicule, and the nickname of "the King's Cowboy," which he applied to him, stuck to the Secretary for a long time. Some mock heroic verses, entitled "Blaquiere's Triumph," appeared in the *Freeman's Journal*,⁵ and a less

¹ Howard's Parliamentary History of Ireland, 3rd Rep. of Hist. MSS. Comm. App., p. 433.

² Affidavit of John Morrison, Dec. 19, 1774, Crown Office, King's Bench.

³ The King v. Bradshaw, Crown Office Records, King's Bench, Feb. 6, 1775.

⁴ Exshaw's Monthly Chronologer for 1775," p. 213.

⁵ "The Freeman's Journal," Feb. 7, 1775.

⁶ Feb. 10, 1775.

ephemeral memorial of an incident which furnished much amusement to the wits of Dublin is preserved in *Præseriana*.¹

With the final acquisition by the Crown of the various residences within the Phoenix Park this record of its origin and formation may fairly close. The more recent history of the Park, considered topographically, has been quite uneventful; and in any case the Nineteenth Century has not yet become sufficiently haloed by time to form an appropriate sphere for antiquarian research.

¹ 2nd edition, vol. i., p. 137. See also McDougall's "Irish Political Characters," p. 150.

APPENDIX.

A list of the Rangers of the Phoenix Park, from the institution of the office in 1661 to its abolition in 1840.

- 1661. Marcus Trevor, Viscount Dungannon.
- 1672. Sir Henry Brouncker, afterwards 2nd Lord Brouncker.
- 1674. Adam Loftus, on surrender of Sir H. Brouncker.
- 1676. Edward Brabazon, afterwards 1st Earl of Meath.
- 1677. July, 2. William Ryder.
- 1677. September, 13. William Ryder and Edward Rushbell.
- 1698. Sir William Fownes, Bart., and Henry Petty 1st Earl of Shelburne.
- 1704. Sir Thomas Smith, Bart.
- 1736. Sir John Ligonier, afterwards Viscount Ligonier.
- 1751. Right Hon. Nathaniel Clements.
- 1761. Lord George Sackville.
- 1785. Sackville Hamilton.
- 1795. Lodge Morris.
- 1796. Edward Cooke.
- 1801. Alexander Marsden.
- 1806. James Trail.
- 1808. Sir Charles Saxton.
- 1812. Sir William Gregory.
- 1830. Sir William Gossett.
- 1835-40. Thomas Drummond.

[The authorities on which this paper is based are for the most part indicated in the foot notes, or in the body of the text. The record it contains has of course involved no inconsiderable research among condite sources of information. The writer desires to express his obligations to Mr. F. Elrington Ball, M.B.I.A., for transcripts of letters in the Carte Papers at the Bodleian Library, and to Mr. Herbert Wood, at present in charge of the Public Search Room at the Irish Record Office, whose invariable courtesy and helpfulness demand the warmest acknowledgment.—C. L. F.]

XXVI.

ON THE MODE OF RINGING OR SOUNDING BELLS IN THE
EARLY CHURCHES OF NORTHERN SPAIN AND OF
IRELAND. BY JOSEPH P. O'REILLY, C.E.

[PLATES XIX. AND XX.]

[READ APRIL 22, 1901.]

ALTHOUGH the early history of Ireland furnishes evidence of relations having existed between its people and those of the Continent, there is, however, a lack of details which would allow of the nature of these relations to be clearly fixed as regards times, countries, and peoples. This is more particularly the case as regards Spain, with which our earliest traditions are connected, and commercial relations have been maintained more or less actively during the historic period. That, in consequence, Spanish habits and customs should have left their traces along our shores is what might be expected; and yet, apart from Galway, nowhere, seemingly, have indications of such been clearly shown to exist. Hence there is an interest in carefully collecting any and every datum which appears to point to Spanish influences, particularly as regards our ancient monuments. In this respect the article in "Smith and Cheetham's Dictionary of Christian Antiquities" (1875), vol. i., contains some very interesting remarks under the heading "Church."

Page 384—"Spain.—As in Gaul, so little or nothing remains in Spain of the churches built before the invasion of the barbarians, and those which the latter constructed were destroyed by the Arabs. The only other churches which can be supposed to date from a period even as early as the ninth century, which have, as yet, been noticed, are a few in the Asturias, not far from Oviedo, having square-ended chancels, and chapels or apartments attached to the sides. The most remarkable is that of the Ermita de Sta. Cristina, near Polo de Lena, which retains the original partition separating the choir from the nave;

the choir is raised above the nave, and the altar-recess above the choir ; these, as well as the western part of the church, are vaulted over, so that there are chambers above them. The central space is covered by a wagon-vault.

“St. Salvador de Valdedios, near Villa Viciosa, has aisles, but the same system of vaulting over both ends of the church exists and, as in the others, there are small chambers right and left on entering the western door. A porch and other chambers are attached to the south side, and may have served as dwellings for priests or attendants on the church. This has been attributed to A.D. 892.

“The upper chambers in all these churches are open to the church, not closed as in Ireland, and capable of being used as dwelling-places. These buildings are all small, but have a good deal of ornament, and exhibit a peculiarity of style, the origin of which cannot be traced to any other country, and which was probably developed from the earlier imitations of Roman work. A clue to the reasons for the peculiarity of plan seems altogether wanting. The square end of the chancel may perhaps be thought to indicate some Irish influence, as that country is the only one where this form is anything but the rarest exception. Although, as has been said, the churches of the earlier period have disappeared, Spain has preserved in a remarkable manner some of the traditions of the arrangements of churches in the earlier periods. Probably these traditions were handed down through a chain of numerous links, the earlier of which have perished.”

Page 384.—“Ireland.—Here we find a great number of very small churches, very roughly built, with very little attempt at any decoration, frequently lighted only by one very small window, but constructed usually with extremely large stones, and not unfrequently built with that material exclusively, the roof being formed by horizontal courses, each brought forward until they meet on the top. Such are the churches or chapels of Tempull Ceannanach ; of St. McDara ; of Fore, Co. Westmeath, and many others.

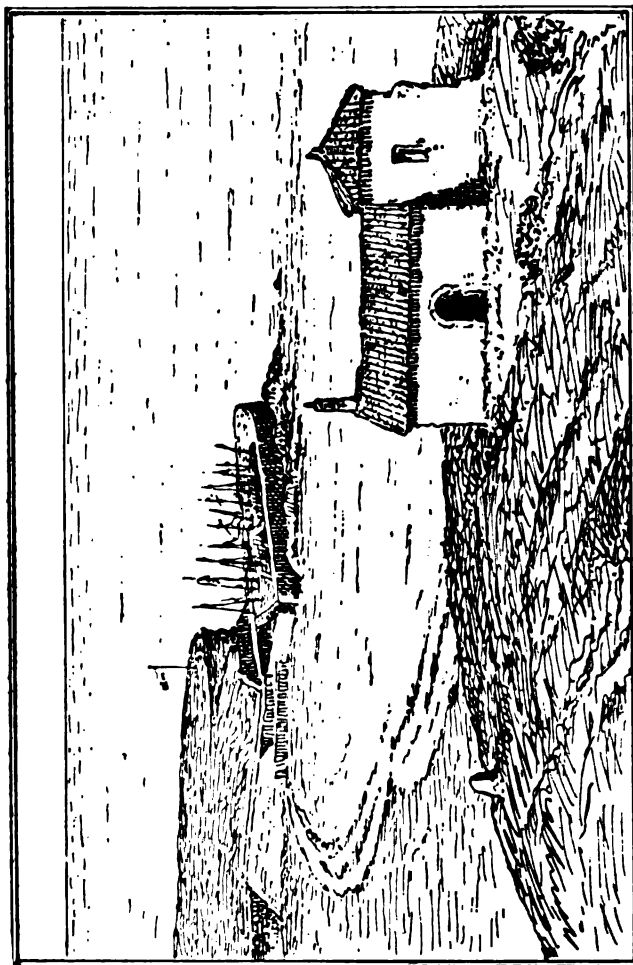
“It is a question of much interest, whence the builders of these churches derived their ideas of architecture, those buildings resembling in no respect any contemporaneous structure in England, France, or Italy. Improbable as the suggestion may at first sight appear, it would seem that it was Central Syria which furnished the models ; that country abounds with churches and monasteries constructed between the third and the seventh centuries, in a style founded upon the Roman architecture of the time, but with many peculiarities both of construction and of detail.

"Among the former of these is the use of very large stones, and the practice of roofing small buildings by advancing each course somewhat nearer the centre than below; examples of both will be found in plenty in Count Melchior de Vogüés' "*Syrie Centrale*." Although in these buildings arched doorways are the most common, those formed precisely in the same manner as the Irish examples, with one large block for a lintel, are frequently found; and one of them ("*Syrie Centrale*," p. 99, fig. 4) may almost pass for the original, of which the lintel of Fore is the rough copy. The Irish buildings have far more the appearance of such copies of the products of a cultivated school of architecture, as might be achieved by native workmen, under the direction of immigrants bringing with them recollections, rather than accurate knowledge, of the edifices they had left behind, than that of the first rude essays of an uncivilized race. The Persians plundered Syria in A.D. 573. The Saracens invaded it in 613, and Central Syria seems to have been entirely depopulated about that period. It, at that time, contained many monasteries and many monks, and it is quite possible that among the numerous foreigners who sought an asylum in Ireland at that period may have been Syrian monks. In the Litany of St. Ængus, written, it is believed, in the year 799 (Petrie, p. 137), among the scores and even hundreds of strangers of various nations, mention is made of seven Egyptian monks buried in Disert Ulidh. The greater part of these immigrants are in the Litany simply called *peregrini* without indication of nationality. Dr. Petrie (p. 127), however, seems to think the peculiarities of construction of these early buildings are due to the colonisation of the country by the Firbolgs and Tuatha De Dannan tribes, which our historians bring hither from Greece at a very remote period. 'Which tribes,' he says, 'were accustomed to build not only their fortresses but even their dome-roofed houses and sepulchres of stone without cement, and in the style now usually called Cyclopean and Pelasgic.'"

Page 385.—"Two peculiarities mark the ecclesiastical architecture of Ireland; one, the altar end is invariably rectangular; the other, that the towers, found near the early churches, are always circular. Perhaps the most probable explanation of the former is that the form was originally used as that most suitable for a very small oratory, and perpetuated in consequence of the extraordinary veneration which the Irish have always entertained for anything connected with the saints."

This square or rectangular form of small oratory is still perpetuated on the north coast of Spain, as may be seen by the accompanying sketch

of a "Santito" situated on the south shore of the Bay of Comillas, province of Santander, of relatively recent construction, and having a belfry exactly like that of Dalkey church.



View of the port of Comillas Prov. of Santander N. Spain, from the S.E. showing "Santito" in foreground.

While the first part of these extracts show an interesting relation between early Christian Architecture in Spain, and that found to exist in Ireland at about the same period, the second, descriptive of the early church or "Oratory" architecture of Ireland, would rather

lead to the inference that, the Spanish style referred to, might have the same origin as that suggested for the corresponding Irish monuments, that is, Syrian of the third to fifth centuries. No doubt, De Vogüés' splendid work has greatly influenced the author of the article, and not without reason. Were we better acquainted with the nature of the relations which existed between the various parts of the Roman Empire and the neighbouring states and peoples during the first three or four centuries of our era, we should probably find no difficulty in accepting the author's suggestion as to the eastern origin of the architectural peculiarities of the buildings he describes. The spread of Christianity followed almost as a matter of necessity the trade routes; hence the great trade centres of the time situated along the shores of the Mediterranean must have, at an early period, received Christian Missions from the east; to this cause must be added the influences of war and pestilence in causing dispersions of Christian communities in the east, and their emigration or flight to more remote and safer countries, where they implanted certain of their customs and modes of life; that Spain, Gaul, and the British Isles received a part of this emigration can hardly be doubted, and the Litany of St. Ængus bears trace of it. That therefore in Northern Africa, Southern and Western Spain, and even in Northern Spain, remains of temples or churches, having an eastern appearance as to style, should be met with is not to be wondered at, and provided other indications are furnished pointing to the same origin, the occurrence may be quite credible. Now it is mentioned in the different articles on bells, as given in the encyclopedias and dictionaries, that in the eastern church, bells were of later introduction than the commencement of the ninth century, and that clappers, or similar instruments for producing sound, were there used instead of bells in the conventual communities. A relic of this custom may be considered as subsisting in the use of clappers, instead of the regular bells, in Roman Catholic countries, during the religious ceremonies celebrated between Good Friday afternoon and Easter Sunday, when it is popularly said, "the bells have gone to Rome." Illustrations of such clappers are given in "Demmin's Encyclopédie des beaux arts plastiques," vol. II., p. 1367, under the heading "Cloches" (bells):—

"Fig. 4.—Shows 'Cloche des Grecs dans l'Empire Turc; instrument en bois que l'on frappe avec des marteaux en fer.'

"Fig. 5.—'Autre cloche des Grecs de l'Empire Turc,' seemingly a square or cubical mass of wood (possibly a metal box?) which is struck also with a hammer or mallet.

"Fig. 6.—'Cloche des Cophtes,' which is simply a variety of No. 4, and drumsticks being indicated as employed instead of mallets."

At p. 1625 is given a wood cut of the "Jaquemart" of Dijon referred to the fourteenth century, and representing a man armed with a hammer with which it strikes the hours on a bell.

It is possible that the method of producing sounds from a bell, by means of blows from a hammer or mallet, may have been employed in the Eastern Church; but there does not appear to be any record to prove that such was the case, at least as regards Church bells. That bells were used as instruments of music, and were struck with a hammer or mallet, would appear from different authorities. In Lord Dunraven's "Notes on Irish Architecture," edited by Miss Stokes (1875), it is stated in vol. II., p. 165:—

"Bell-ringing in the tenth century, appears to have been practised in two different ways, one being the mere use of the signal-bell of the hand-bell ringer; the other the art of the carillon player which implies a knowledge of music and the exercise of the players' talent on a series of bells tuned to different notes, which could form a harmonious accompaniment to the harp or note. Illustrations are given in vol. II., pp. 165-167.

Fig. 1, pp. 165-167.—Fig. 1, being from the capital of a column in the Church of St. George de Bocheville, Normany. (This capital is also illustrated, as a development, in *Le Bas' Dictionnaire Encyclopédique de l'Histoire de France* (1842-45), vol. II. p. 204. It shows a series of bells suspended from a beam or bar and being struck with hammers).

Fig. 2, p. 166.—Taken from an ancient psalter in the British Museum, (King's Library, 20, Bk. XI.). King David is represented playing on a set of five bells suspended from an arched beam, and having a hammer in each hand.

Fig. 3.—Taken from a manuscript in the Royal Library at Brussels; it represents a female figure (? male) seated and striking a set of four bells with hammers.

In the note it is mentioned that, in one compartment of an ancient sculptured cross at Kilcullen, which stands to the north of the Round Tower, the figure of an ecclesiastic may be seen raising a hammer to strike the bell which hangs before him (? Ostiarius).

Lord Dunraven, adds (vol. II. p. 166):—

"The bells preserved in the Irish belfries such as those referred to in the tower of Armagh, at the date 1020, may have

been a group of such objects slung in a row from a bar in the upper chamber of the Tower, in some such manner as we see illustrated in the illuminated MSS. of the ninth and tenth centuries. Thus in the fig. 4 (p. 167), taken from a MS. of St. Blaise, A.D. 800 to 900, the bar is placed across a round arch springing from shafts crowned by capitals of an early Romanesque type; and the little tower, which, though in ignorance of perspective, is drawn as if rising on the capital, was most probably meant to represent the belfry in the back-ground where the bells were kept. These slender towers, with small apertures and conical roofs surmounted by a cross, quite correspond with the Irish Cloitchech.

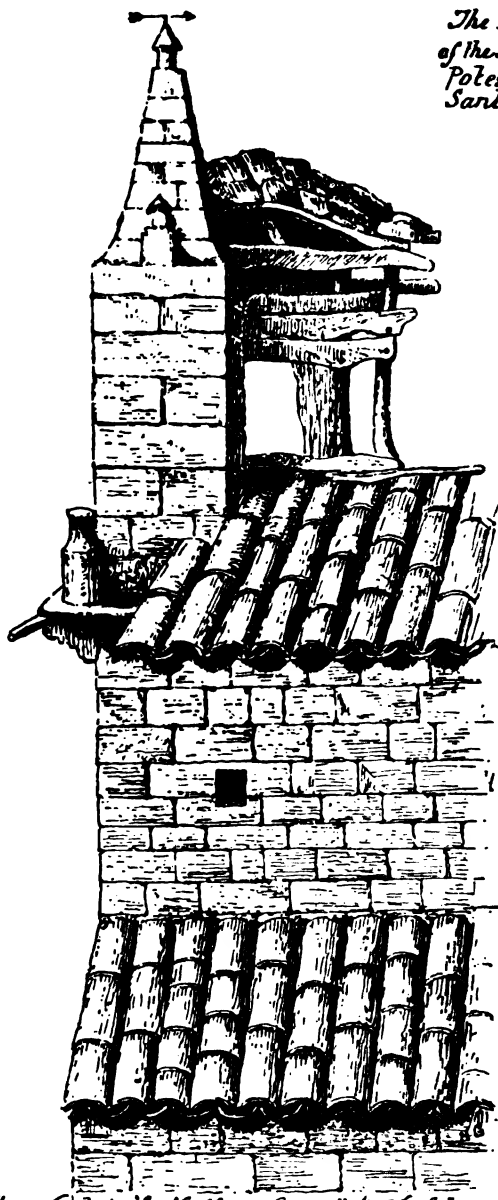
Page 169. "If we adopt the idea that the 'Cloitige' were not only, as their original name proves, places where bells were housed, but also where carillons were played, we need not disconnect the towers from the bells, or sever them from the beautiful associations with their sound which still linger in the traditions of the peasantry and which their name conveys."

From the foregoing, it may be inferred that there is no proof that bells, as used for ecclesiastical purposes, were "rung"—that is, were given an oscillating motion by means of a rope—before the eleventh or twelfth centuries; and it is suggested that such bells may have been sounded by means of a hammer or mallet up to that period, as is actually the custom still in the north of Spain, as appears from the following statement by Hans Gadow, in his "*In Northern Spain*," when describing the Town of Potes, capital of the district of La Liebana, in the province of Santander. At p. 25, he says:—

"The *ayuntamiento*, or town hall, was formerly a church. The illustration (which accompanies the description)¹ is intended to show the curious bell-tower which is so characteristic of the small churches in northern Spain. It is really not a tower, but a continuation of the western wall of the building, with eaves for the bells which are not rung, but belaboured by hand, a man ascending to them through the roof and playing them in quick time. The big bells in cathedrals are usually rung by swinging the bells round and round, in a circle by short ropes attached to two horizontal beams, and not in the ordinary way from below with long ropes, which either rock the bell or the clapper. In the marvellous Giralda tower of Seville, foolhardy bell-ringers will, for a consideration, curdle the visitors blood by hanging

¹ An enlarged copy of which accompanies this present paper.

*The Bell Tower
of the Town Hall of
Potes, Prov. of
Santander Spain*



From Hans Gadow's "In Northern Spain" p. 26 Enlargement 2-100

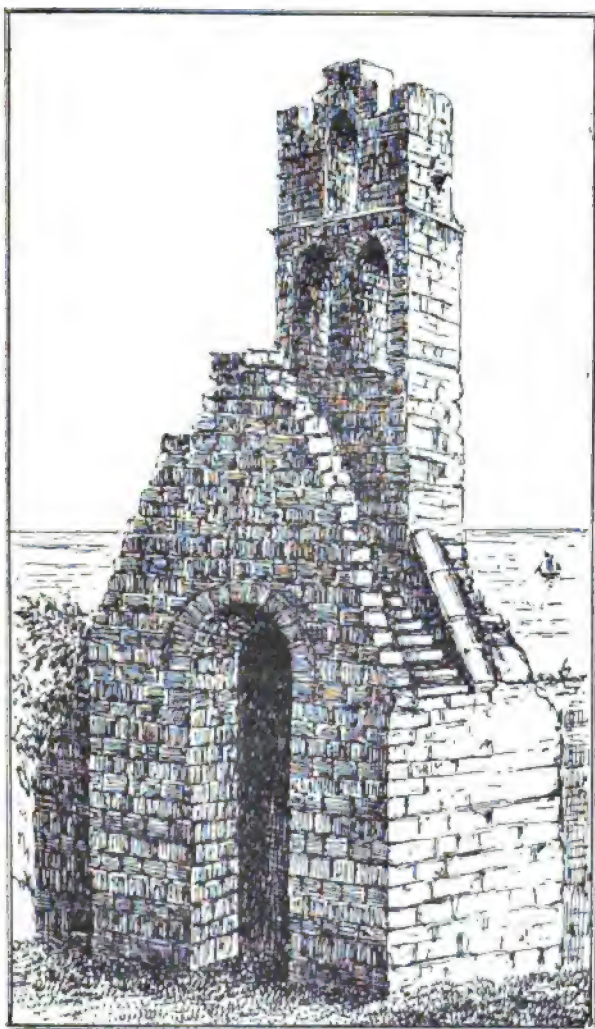
on to the beam and allowing themselves to fly round, passing by this means out of the window in which the bell is rung."

Unfortunately the author's description hardly gives a clear idea of the bell-tower, and the sketch of it is still less clear and satisfactory, but it may be gathered from it that the western wall is continuous in height with one or two openings for bells, and is crowned with a tiled roof, forming eaves. Many examples might be given from the churches of southern France of a similar form of bell-tower, as well as also from Ireland, as, for instance, in the case of Howth Abbey tower,¹ or of the old church of Dalkey, the belfry of which has a double aperture; an elevation of the western wall-face and of the end of this wall showing the old steps leading to the belfry accompany the present paper. What is very interesting in Gadow's description is the statement that the bells are "belaboured" or beaten, as he says, "in quick time," and that access to the bells is through the roof for that purpose. He does not say that, "in all the small churches in northern Spain," the same mode of sounding the bells prevails, but such might be inferred from the wording of the phrase. This would not, however, be correct, since my experience of five years' residence in this province enables me to state so. Having lived at Comillas (a fishing village situated about 24 miles west of Santander, and about 35 miles by road from Potes), I had occasion to become familiar with the modes of ringing or sounding the bells of the village church, which is large and well built, and capable of easily accommodating 500 to 600 people. There is a western tower in which are the large bells, and on the south side of the chancel a small belfry of the description already mentioned. On ordinary Sundays and feast days the small bell was usually rung (by means of a rope) for the low masses, and the large bells for the principal or parish mass, say of 11 o'clock, a.m. On these occasions these large bells were played upon "in quick time" by youths, the tower floor being at a level or height such as to allow them to so do conveniently; my impression is that they used wooden mallets for the purpose, possibly drumsticks, but the sound had not the sharp ring which would be expected from the use of metal hammers. The effect—a series of very rapid strokes, producing an almost continuous sound, and marked by a few stronger notes at regular intervals—was extremely agreeable to the ear, though strange for a northern. On

¹ See *Journal of the Royal Society of Antiquaries of Ireland*, 1896. "Notes on the Ecclesiastical Antiquities in the parish of Howth, Co. Dublin," by Robert Cochrane, F.S.A., M.R.I.A., vol. xxvi., pp. 1-21.

still more solemn occasions, the bells were sounded by swinging them round and round by hand, and by means of the cross-bar placed on the axis of suspension, the weight of the bell being counterbalanced above the axis so that they could turn freely. Thus the three methods of sounding the bells of the church prevailed at Comillas during my stay there from 1855 to 1862, and probably prevails there at present. I am unable to speak as regards the neighbouring towns of St. Vincente de la Barquera in the west, and Torre la Vega in the east, but it is hardly likely that the custom should be confined to Potes and to Comillas in the province. In any case, having regard to the very conservative habits of the Spaniards in many respects, it is to be presumed that the custom is a survival of the last and previous centuries. One of the interesting points in the matter is the Spanish term for the sound of a bell, or, as we would say, the "ringing" of a bell:—"Tocar la campana" is to "sound the bell," and "tocar" is explained, in Lopes and Bensley's "Spanish and English Dict." (1899) as "to touch"; to play on a musical instrument"; "to toll or ring a bell." "Al toque de campana," at the sound of bell. "Toque" is explained "touch," ringing of bells, blow given to anything; "Al toque de tambor," "at the beat of drum." It would seem, therefore, that the Spanish word for the sound of bell implies *percussion*, and would lead to the presumption that formerly, or until the full development of the Spanish language, the bells were usually struck rather than "pulled." It is interesting to compare these terms with the latin words mentioned as used by Columba, and mentioned in Ledwich's "Irish Antiquities," p. 160. "About the middle of the sixth century," Columba says to one of his attendants, "Cloccam-pulsa"; ("Vita S. Scot," p. 65), evidently "pulsa" fairly corresponds to the Spanish "Toca," and might be translated, "strike the bell." In order to strike the bell access must be had to it either from a floor or from an exterior point. At Potes the access, as stated, is through the roof, implying a ladder or staircase leading thereto. At Comillas the tower-floor being at the height of the bells, or nearly so, secured the necessary facility. In the absence of a tower with staircase or ladders, it is therefore evident that the access must be by a ladder or steps applied to the exterior or interior face of the western wall where the bells are hung. Hence there is a ground for connecting the staircase or steps presented by the Abbey Church of Howth exteriorly to the western wall, and which lead to a platform at about 5 feet to 6 feet below the level of the bell openings, with the rude arrangement of Potes "ayuntamiento," and of presuming that the bells were in this case played as at Comillas. This

presumption would hold still more strongly as regards the old church of



West view of St. Mary's Church Howth

Dalkey, since the flight of steps in this case is placed on the western wall itself, starting from the eaves of the south wall and reaching

within a few feet of the bell openings; a parapet having been maintained on the western face of the wall, as is the case in Howth Church, where the masonry is of better design and workmanship, and better preserved than at Dalkey. Of course there can be only a strong presumption in favour of this interpretation of the staircase leading to the belfry in these two cases, but the structure clearly admits of the interpretation. Could it be shown that the religious orders to which these churches belonged had relations with Spain or southern France, the case would be strengthened. That there were continuous commercial relations with both these countries from at least the period of the introduction of Christianity must be admitted, were it only on account of the wine required for ecclesiastical purposes.

O'Halloran, in his Introduction to "Irish Antiquities and History," p. 121, when insisting on the importance and strength of the Irish merchant marine in early times, says:—"The annual duties (so late as the reign of Brien Boroihme) arising from goods imported into the single port of Limerick, and *paid in red wine*, amounted to 365 pipes." Now such wine came either directly or indirectly from Southern France or Spain, and it would not be excessive to assume that small colonies of merchants were settled in the principal ports of Ireland from these countries, and that they would attract, for their service from the mother country, religious communities, or branches of such, to such ports where they established small churches or houses in the style of their country, and as much as possible in harmony with the habits and customs of their fellow-countrymen. In this respect it is worth noting Petrie's Commentary on the word *Aistreoir* or *Aistire* (p. 377, "Round Towers"), which word he cites from O'Reilly's Dictionary as meaning "an officer whose duty it was to ring the bell in the steeple of the church"; he adds: "And as it more clearly defines the duties of this officer and identifies the name with *Ostiarus*, I avail myself of it here." *Aistreoir*, *i.e.* changeable his work, *i.e.* to ring the bell or use the key; or *Uaistreoir* (high his work), when the bell is that of a Cloitheach, or *Istreoir*, *i.e.* low his work, when it is a hand bell." He concludes that the office of *Aistire* existed in the time of St. Patrick, as even the name of the very person who held this office is preserved. "Sinell, the man of the ringing of the bell." In this commentary it is assumed that the tower-bell was rung with a rope, which Lord Dunraven seems rather to discredit, and to assume that the tower-bell was struck or "toll'd." Now it is of interest to note that the word *Ostiarus* still survives in Spanish as "*Ostiaro*" = "ostiary," "door-keeper," "one of the minor orders of the Roman Church" (Lopes and

Bensley's Dict. of Spanish and English, 1887), while it has not survived in French.

That in the south and west of Ireland the relations with Spain were frequent and continuous is proved by the remarks in Geo. Smith's "*History of the Co. Cork.*" Thus in vol. i. (edition of 1756), p. 175, when speaking of Dingle, he says:—"The Irish called it formerly *Daigean-na-Cushy*—i.e. the fastness or Castle of Hussy; and speaking of its architecture (p. 176), he says: "Several of the houses were built in the Spanish fashion, with ranges of stone balcony windows, this place being formerly much frequented by ships of that nation who traded with the inhabitants, and came to fish on this coast. Most of the houses are of stone, with marble doors and window-frames. Many of them have dates on them as old as Queen Elizabeth's time, and some earlier. The Parish Church dedicated to St. James is said to have been built at the charge of the Spaniards. It was originally very large.

At p. 191, speaking of Kilmelcedor Church, he says:—"This parish and the church is named Kilmelcedor, i.e. Mechedor's Church, and is said to have been built by the Spaniards, who formerly erected many other churches hereabouts."

In Vol. II., p. 40, under the date of A.D. 1552, he says:—"The King was advised by Parliament to build a fort on the harbour of Baltimore to oblige foreign fishermen to pay a tribute, but this advice was not put in execution." In a note he adds, John Dee, who wrote a tract called the "*British Monarchy*," says:—"It is necessary to leave to posterity some remembrance of the places where our rich fishing is, as at Kinsale, Cork, Carlingford, Saltessees, Youghal, Waterford, Dungarvan, &c., and all enjoyed by strangers, as it were, within their own King's peculiar limits; nay, rather as if their coasts, seas, and bays were of their private and several purchases, to our insuperable loss, discredit, and discomfort, and to our no small damage in these perilous times of most subtle treachery and fickle fidelity." In his time, he says, "Blackrock was fished by 300 to 400 sail of Spaniards and Frenchmen." This tract is of 1576.

There is reason for presuming that these Spanish fishermen came from the Cantabrian coast, more particularly from the provinces of Galicia and Biscay. That the Spaniards also traded on the east coast of Ireland, and in particular with Dalkey, which was then the port of Dublin, is shown by the statement given in D'Alton's "*Co. Dublin*," p. 888:—"That in 1360 the Provost and Bailiffs of this little borough received the Royal command to permit the departure of a Spanish ship

which had been stopped to convey the Prior of St. John of Jerusalem, then also Chancellor of Ireland, inasmuch as he was not prepared to travel at the time."

Furthermore, he states :—"In 1396, King Richard granted to Archbishop Northalis and his successors in the See of Dublin, that his and their Bailiffs for the time being should exercise the office of admiral or water-bailiff within the manor, lordship, and port of Dalkey, and receive all fees thereunto belonging, and that no admiral or water-bailiff of the King should intermeddle with their authority." The importance of this grant appears from a contemporaneous instrument, wherein it is stated that "there is no safe anchorage or good lying for great ships coming into the port of Dublin, with wines, salt, corn, and other merchandise freighted for Dublin from foreign parts, only at the port of the Archbishop of Dublin, in the town of Dalkey, which is six level miles from Dublin, and out of the port and liberties of the city, at which place they are bound to unload, and there is no other port in the neighbourhood where they can ride so safe from storm, and the merchants were wont to buy their goods at said port of Dalkey, as well as in the port of Dublin and other ports, to land same, and to bring it up on cars or in boats to the city, and there land and pay customs," &c.

XXVII.

THE ETHNOGRAPHY OF CARNA AND MWEENISH, IN THE PARISH OF MOYRUSS, CONNEMARA. BY CHARLES R. BROWNE, M.D.

[READ NOVEMBER 12, 1900.]

(PLATES XXI. TO XXV.)

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I.—INTRODUCTORY REMARKS.

THE district of south Connemara having been found in the visit made to Gorumna and Lettermullen to possess so much matter of interest and to be so worthy of study, I was encouraged to extend the scope of investigation a little further along the coast, none the less that the establishment of the tourist traffic, hotels for sportsmen, and the efforts of the Congested Districts Board are introducing elements of change into a district which, up to this, seems to have retained, to a large extent, the conditions which prevailed in Roderick O'Flaherty's

time, and even much earlier. Carna was selected as the centre of operations, as from it the islands of Mweenish and Mason, and the primitive district at Mace Head were most easily accessible. This district has been comparatively lately opened up, and is now undergoing considerable change, due to the influence of the tourist traffic and the better means of communication with the outer world, provided by good roads, and the causeways connecting the islands with the mainland, so that steps should be taken at once before the disturbing elements should have time to obliterate so interesting a page of old Irish peasant life. In the work of this survey I was greatly aided by Mr. T. J. Westropp, M.R.I.A., to whom I wish to tender my heartiest thanks. From him I received the greatest help in every branch of the work, and more especially the photographic and archaeological departments, in the last-named of which he is, what I cannot claim to be, an expert, and was able to treat of the subject much more fully and satisfactorily than I could have hoped to have done.

The work was this year more troublesome than usual, and there were several difficulties to be overcome not met with before. One of these was the inclemency of the weather prevailing during our stay, and another that somehow or other a rumour that the Militia Ballot Act was about to be put in force had been circulated, together with other war reports, and this made many of the men suspicious of allowing themselves to be measured for fear that in some way we were connected with the recruiting service.

II.—PHYSIOGRAPHY.

The district of Carna, which forms part of the parish of Moyrus, in the barony of Ballinahinch, is a very poor one, cut off inland from the rest of the country by a belt of mountain and bog land almost uninhabited, and bounded on the south, east and west by the sea. The coast is low and rocky and very irregular, and much indented by small arms of the sea. The surface is diversified, rising in places into barren rocky hills, and in other parts consisting of bog and swamp. The low ridges of granite lie mostly along the coast line, and their surface soil is poor and shallow. The soil of the islands is also poor, and in the case of Mweenish and Mason is largely composed of dunes and sandhills. There are numerous small streams and several lakes in the boggy parts, the principal of which are Loughs Skannive and Bola.

Vegetation is scanty and poor, and there are but few trees, though those which have been planted of late years seem to be growing well, so neither climate nor soil can be altogether unsuitable for them.

The only arable land near the sea is poor in the extreme, and much encumbered by rocks. The climate is mild but wet, rain and storms being severe and frequent.

The general aspect of the country has been very aptly described by the Rev. J. A. Finlay, in an article published in the *New Ireland Review*¹ some time ago:—

“The stronghold of the constabulary, in common with the humbler edifices on which it looks down, commands a view which, in point of monotonous barrenness, cannot be surpassed. Inland, the country seems formed of an immense sheet of granite, raised at the borders into hills, and broken occasionally by patches of peat and heather. At intervals the gray and brown expanse is relieved by lakes, which take an inky tint from the peat, with which they are bordered and lined. Seawards the granite surface is broken into a rugged fringe, between the tatters of which the ocean shows itself, black and scowling, for the most part, as if it borrowed its expression from the forbidding landscape. Along the seashore a strip of the wilderness of rock and heather, varying in breadth from one to two miles, is thickly dotted with human habitations.”

With the exception of the village of Carna, which consists of houses placed in some regular order, and contains some good buildings, there is nothing even approaching a hamlet, all the so-called villages being merely collections of houses scattered over a whole townland without any attempt at regularity.

III.—ANTHROPOGRAPHY.

1. *Methods.*—No remarks need be made as to methods employed, as these were precisely the same as those made use of in previous surveys, and no changes were introduced either in instruments or methods. A good many difficulties were experienced, and the people were more difficult to approach than those in most of the districts previously worked. The shortness of the time at our disposal, and the inclemency of the weather prevailing during our stay, were great hindrances to our work, as were the rumours of impending war, which was, perhaps, the greatest obstacle of all, as many of the men were obviously afraid to subject themselves to examination, owing to the prevalence of a rumour that conscription for the militia was about to be resorted to, and our visit and physical measurements seem to have been imagined by some to have a connexion with this. It may also

¹ “The Economics of Carna,” *New Ireland Review*, vol. ix., p. 67, April, 1898.

be mentioned that many were dissuaded by a man who claims fairy acquaintances giving out that the measurements were unlucky.

When all these things are taken into account it is not to be wondered at that we were only able to obtain measurements of thirty-eight men, who, however, from the fixity of type prevailing in this as in most western districts, were fairly representative specimens.

2. Physical Characters:—

(A) The following is a description of the prevailing physical characters of the people of this district, who are as a rule strong, well-developed, and sturdy, though in common with most of the peasantry of our west coast districts they age early from hard work and exposure to the weather.

Stature and bulk.—The inhabitants of this district are of about average stature, of a stout and square build, and are muscularly well-developed and capable of much hard work and endurance.

The mean height of the 38 adult males measured was 1716 mm. or 5 feet 7½ inches (about the usual Irish mean stature). The extremes were 1555 mm. (5 feet 1½ inches) and 1860 mm. (6 feet 1½ inches). There is a fair proportion of men of above the middle height, and but a small one of men of very short stature. Of the 38 men measured 5 were of 1800 mm. (5 feet 11 inches) and upwards, and only 3 of less than 1600 mm.

Limbs.—The hands are long but well-shapen, and the arms are muscular and strong. The feet appear to be rather large. The fore-arms are long in proportion to the stature, but less so than in the people of the neighbouring islands of Gorumna and Lettermullen. The span of the arms is usually great, but in one case was observed to be less than the stature.

Head.—The head is well-shaped, with upright forehead and prominent frontal eminences. The glabella and superciliary eminences are also well-marked. The vertex is round and the head curves down from it without any marked projection from the line of the neck. The eyes are rather deep-set and the eyebrows thick and level.

Hair.—The hair is usually light or dark brown, these colours forming about 80 per cent. of the cases noted. True black and red hair are both of infrequent occurrence comparatively speaking, and much of that noted as black is really an intensified dark brown. In a large proportion of cases the hair is wavy or curly. The beard and eyebrows are both full and abundant, and are generally lighter in tint than the hair of the scalp.

(B.) *Tables of Hair and Eye Colours:—*ADULTS.—I. *Males.*

HAIR.	EYES.			Totals.	Percentage Hair Colours.
	Light.	Medium.	Dark.		
Red, ..	2	1	—	3	1·64
Fair, ..	18	1	—	19	10·46
Brown, ..	88	8	2	98	53·84
Dark, ..	33	10	8	51	28·02
Black, ..	6	4	1	11	6·06
Totals, ..	147	24	11	182	100
Percentage Eye Colours, }	80·77	13·18	6·05	100·0	—

Index of Nigrescence, 28·03.

ADULTS.—II. *Females.*

HAIR.	EYES.			Totals.	Percentage Hair Colours.
	Light.	Medium.	Dark.		
Red, ..	1	—	—	1	0·79
Fair, ..	16	—	—	16	12·59
Brown, ..	60	7	2	69	54·33
Dark, ..	14	8	11	33	25·99
Black, ..	4	1	3	8	6·30
Totals, ..	95	16	16	127	100·0
Percentage Eye Colours, }	12·59	12·59	74·80	99·98	—

Index of Nigrescence, 25·11.

Combined Index (both sexes), . . 22·98.

CHILDREN.—I. *Boys.*

HAIR.	EYES.			Totals.	Percentage Hair Colours.
	Light.	Medium.	Dark.		
Red, ..	1	0	0	1	0·96
Fair, ..	13	1	1	15	14·43
Brown, ..	57	6	3	66	63·46
Dark, ..	13	4	3	20	19·23
Black, ..	0	0	2	2	1·92
Totals, ..	84	11	9	104	100·00
Percentage Eye Colours, }	80·77	10·58	8·65	100·0	—

Index of Nigrescence, 7·68.

CHILDREN.—II. *Girls.*

HAIR.	EYES.			Totals.	Percentage Hair Colours.
	Light.	Medium.	Dark.		
Red, ..	1	0	1	2	2·38
Fair, ..	10	1	0	11	13·10
Brown, ..	39	11	3	53	63·10
Dark, ..	8	5	3	16	19·04
Black, ..	0	0	2	2	2·38
Totals, ..	58	17	9	84	100·00
Percentage Eye Colours, }	59·05	20·24	10·71	100·0	—

Index of Nigrescence, . . 8·32.

(c.) *Physical Proportions:—*

We give here, as in previous reports, the proportions borne by the principal measurements to the stature taken as equalling 100.

FACE: The face is very long in proportion to the stature, being 7·4.

. The extremes noted were 6·6 and 8·2.

Upper Face.—The mean for this measurement is 4·1, decidedly short, and almost the same as that noted in Gorumna. The extremes noted were 3·6 and 4·6.

Nose.—The mean for this proportion is 2·9, but the relationship borne by this measurement to the stature is not at all as constant as is the case with some of the other measurements. The extremes were 2·2 and 3·4.

SITTING HEIGHT: The mean of the 38 measurements is 52, with extremes of 48·3 and 54·6.

Span.—In only one of the cases noted in this series of measurements is the span less than the body height. The mean for this measurement is 105·8, as in the majority of cases it considerably exceeds the stature and is higher than previously noted, the highest figure up to this being 105·7 in Ballycrov. The extremes were 99·5 and 110·0.

The mean cephalic index was 79·2, or when reduced to the cranial standard by the subtraction of two units 77·2. It is thus mesaticcephalic and rather high up in that class, thus presenting, it is interesting to note, a strong contrast to the cephalic indices of the inhabitants of the neighbouring islands of Gorumna and Lettermullen, whose index (76·9 or 74·9) lies on the borderland of dolichocephaly and with that of the Aran islanders, an evident result of the former isolation of these districts and the consequent preservation and perpetuation of distinct types by intermarriage only within limited areas.

Of the 38 cranial indices obtained 18 were brachycephalic (80 and upwards), 17 were mesaticcephalic, and 3 were dolichocephalic.

Face.—The face is relatively rather long for the stature, with somewhat prominent cheek bones, and is rather broad in the bigonial region, the angles of the jaws being strongly marked and prominent. The nose is usually straight or slightly aquiline and is generally long. The mean nasal index is 63·1. The lips are of medium thickness, the lower often hanging. The chin is rather square. The teeth are usually even and sound. The irides of the eyes are blue, grey, or hazel, seldom darker. The ears are small and well-shapen, and very few abnormal types were noted.

Skin.—The skin is pale, reddening, or in some cases freckling, on exposure. but not "bronzing." Wrinkles come early, especially on the forehead and about the eyes, where they are numerous and deep.

Hand.—The proportion borne by the hand to the stature is exactly the same as that obtained in the case of the men measured in Gorumna and Lettermullen the previous year, viz. 11·3, which is proportionally very long. The extremes were 10·4 and 11·9.

Forearm.—The forearm also is long, giving a mean proportion of 15·3, with extremes of 13·6 and 16·8.

(D) Detailed List of Measurements.

Indices.										Proportions to Stature.—HEIGHT = 100.				
No.	Cephalic.	Height.	Facial.	Bignonial.	Alveolar.	Nasal.	Hand.	Forearm.	Span of Arms.	Height Sitting.	Race.	Upper Race.	Nose.	
1	81.0	69.8	106.0	76.1	98.0	66.1	10.7	16.0	104.0	52.6	7.2	4.0	3.0	
2	77.1	63.7	104.6	84.6	100.0	71.7	11.4	—	107.9	53.4	7.9	4.4	2.2	
3	77.5	65.0	111.2	82.6	100.0	63.5	10.8	15.3	103.3	52.9	7.4	4.0	2.9	
4	75.1	62.9	112.5	93.7	103.1	63.5	11.6	15.6	105.2	53.0	7.4	4.0	3.0	
5	75.6	64.7	113.1	86.9	100.0	68.0	10.9	13.6	102.1	53.3	7.6	4.5	3.0	
6	79.4	64.8	109.2	80.0	103.0	52.7	11.9	15.3	105.6	53.1	7.3	4.2	3.3	
7	77.6	65.7	107.7	80.0	100.0	62.3	11.5	15.4	108.6	50.7	7.9	4.6	3.3	
8	79.4	67.5	121.7	88.9	97.9	68.8	11.3	16.3	106.7	52.9	6.8	4.1	2.2	
9	80.0	68.5	119.3	94.1	100.0	58.2	10.4	15.1	109.0	51.7	6.9	4.1	3.3	
10	80.5	64.5	114.4	88.0	94.2	56.6	11.0	15.6	106.8	50.4	7.1	4.2	3.0	
11	83.2	67.9	113.4	86.6	100.0	56.6	11.5	14.8	107.5	51.4	7.2	4.0	2.9	
12	78.2	62.9	116.1	87.1	101.0	58.2	11.3	16.5	109.4	50.6	6.9	3.7	3.0	
13	80.0	67.5	111.8	89.7	100.0	52.7	11.5	15.6	108.3	52.2	7.2	4.3	3.0	
14	81.4	64.4	114.5	91.1	100.0	60.0	11.4	15.0	109.0	52.7	7.2	3.7	2.9	
15	81.6	67.0	124.3	95.7	97.1	62.7	11.4	14.7	106.2	52.1	6.6	3.9	2.9	

18	81.4	70.1	105.2	88.0	101.1	64.8	11.6	15.6	108.9	52.9	7.9	4.4	3.2
19	80.8	64.1	102.6	77.4	100.0	60.0	11.2	15.6	104.1	50.0	7.5	4.1	2.8
20	75.6	60.3	117.5	94.7	100.0	67.3	11.2	16.4	107.0	48.3	7.3	4.1	3.1
21	79.0	71.8	104.0	88.2	100.0	67.3	11.2	14.7	105.4	51.0	7.1	4.6	2.8
22	78.5	65.5	109.8	85.6	101.0	60.4	11.4	15.4	104.0	49.7	7.3	3.8	2.9
23	80.6	71.4	114.2	94.5	96.9	74.0	11.0	14.5	99.5	51.9	7.0	3.6	2.8
24	83.7	64.3	112.0	91.2	100.0	65.2	11.1	15.4	102.0	51.7	7.4	3.9	2.7
25	82.8	69.2	115.4	96.0	100.0	67.3	12.0	13.5	107.1	51.4	7.2	3.9	3.0
26	77.9	63.1	118.2	89.2	101.0	56.6	11.4	16.8	109.8	50.0	6.9	3.9	3.0
27	78.1	65.6	110.3	87.3	103.1	65.9	10.9	15.4	106.1	53.7	7.8	4.2	2.7
28	78.2	68.5	104.4	86.5	95.0	54.4	11.0	14.7	104.8	52.2	7.7	4.3	3.2
29	86.5	71.2	112.9	86.3	102.3	60.4	11.1	14.5	107.3	51.5	6.7	4.0	3.1
30	80.1	68.1	112.0	88.0	96.0	67.3	11.3	16.1	106.2	53.0	7.9	4.3	3.1
31	72.5	63.5	112.9	90.3	99.0	65.9	11.5	16.5	107.2	53.2	7.4	4.2	2.7
32	75.6	63.2	106.5	78.8	96.0	54.7	11.7	15.4	104.7	51.3	7.9	3.6	3.1
33	82.3	69.3	106.3	84.3	97.7	66.0	11.2	15.6	104.2	54.6	8.2	4.2	3.0
34	84.4	69.5	121.1	89.4	96.9	68.8	11.2	14.1	104.6	53.4	7.2	3.6	2.3
35	80.4	64.3	114.7	98.1	101.0	58.2	11.4	16.4	108.9	50.4	7.0	4.2	3.1
36	74.1	69.8	110.8	85.0	101.1	75.0	11.9	16.2	108.4	50.6	7.1	3.9	2.6
37	77.6	69.3	113.8	96.7	102.1	68.8	11.7	15.8	101.5	53.8	7.4	3.9	2.9
38	75.0	64.3	110.2	86.6	99.0	59.2	11.4	15.2	103.3	52.9	7.3	4.6	3.2
Mean,	79.2 (77.2)	66.3	111.5	89.8	99.5	63.1	11.3	15.3	105.8	52.0	7.4	4.1	2.9

No.	Name.	Age.	Locality of		Eye Colour.	Hair Colour.	Skin.	Nose profile.	Ears.
			Father's people.	Mother's people.					
1	*M'Donogh, Michael,	25	Mace	Mace	grey	black	dark	straight	Outstanding
2	Kelly, Martin, .	36	"	"	blue	brown	pale	straight	Outstanding
3	Conolly, Patrick,	20	"	"	green	brown	ruddy	retroussé	Outstanding
4	Green, Patrick, .	27	"	"	blue	brown	ruddy	straight	Flat, lobes attached
5	O'Donnell, Patrick,	24	Moyrus	Moyrus	blue	brown	ruddy	retroussé	Flat
6	Bullestron, John,	42	Mace	Mace	blue	black (curly) brown	pale	straight	Outstanding lobes attached
7	King, Edward, .	45	"	"	grey	brown	pale	straight	Flat
8	Green, John, .	21	"	"	green	red	freckled	straight	Flat
9	M'Donogh, Patrick,	16	"	"	blue	fair	freckled	sinuous	Flat
10	†Bullestron, John,	20	"	"	grey	brown	ruddy	aquiline	Outstanding
11	Corbett, Patrick,	20	"	"	grey	dark-brown	pale	straight	Outstanding
12	Bullestron, Martin,	20	"	"	grey	brown	ruddy	aquiline	Outstanding
13	Bullestron, Patrick,	27	"	"	grey	dark-brown	ruddy	aquiline	Outstanding lobes attached
14	Conneely, Simon,	23	"	"	blue	brown	pale	straight	Flat
15	M'Donogh, Joseph,	23	"	"	blue	brown	ruddy	straight	Flat
16	Mulkerrin, Mark,	31	"	"	grey	dark-brown	pale	straight	Flat, lobes attached
17	Keely, Peter, .	25	"	"	blue	brown	pale	straight	Flat
18	Green, Thomas, .	30	"	"	green	brown	pale	straight	Outstanding
19	Corbett, James, .	20	"	"	grey-blue	brown	pale	straight	Flat
20	Conneely, Joseph	45	"	"	green	dark	ruddy	sinuous	Outstanding lobes attached
21	Green, Colman, .	22	Rusheen-namona	Rusheen-namona	blue	fair	ruddy	straight	Outstanding lobes attached
22	King, John, .	21	Mweenish	Glink	blue	brown	freckled	straight	Outstanding lobes attached
23	Hernan, Mark, .	21	Rusheen-namona	Callifeenish	grey	brown (curly)	ruddy	straight	Outstanding lobes attached
24	Mulkerrin, Michael,	25	Callifeenish	"	blue	fair (curly)	ruddy	straight	Outstanding lobes attached

* Related to Nos. 10 and 12.

† Related to Nos. 1 and 12.

No.	CEPHALIC.		FACIAL.				NASAL.			AURICULAR RADII.			HEIGHT.		FORELIMB.		
	Length.	Breadth.	Face length.	Upper Face length.	Breadth.	Bigonial Breadth.	Length.	Breadth.	Internal Bi-ocular breadth.	Vertical.	Nasial.	Alveolar.	Standing.	Sitting.	Span.	Hand.	Forearm.
5	166	134	74	142	104	56	37	29	143	98	100	1860	980	1934	210	298	
4	158	130	73	136	110	46	33	33	130	97	97	1640	877	1770	188	—	
0	155	133	72	148	110	51	33	29	130	93	93	1800	952	1860	195	275	
5	154	128	70	144	120	52	33	33	129	97	100	1730	927	1820	200	270	
1	152	122	69	138	108	50	34	34	130	104	104	1650	880	1685	181	235	
9	158	130	75	142	104	59	31	31	129	100	103	1770	940	1870	210	272	
1	156	130	75	140	104	53	33	33	132	98	98	1620	822	1760	187	250	
4	154	115	69	140	102	48	33	33	131	94	92	1696	900	1810	192	278	
0	160	119	71	142	112	55	32	32	137	97	97	1765	875	1765	180	260	
0	161	125	73	143	110	53	30	30	129	104	98	1750	882	1851	193	274	
6	163	127	70	144	110	52	33	30	133	97	97	1770	910	1903	204	262	
2	158	124	67	144	108	55	32	28	127	100	101	1810	917	1980	206	298	
0	160	127	72	142	114	55	29	29	135	97	97	1787	933	1935	207	278	
4	158	124	65	138	112	50	30	31	125	97	97	1730	912	1886	197	270	
6	167	115	68	143	110	51	32	32	138	101	99	1751	912	1860	200	267	
4	164	127	73	144	103	57	32	34	125	96	96	1655	880	1806	202	243	
3	154	136	77	138	106	55	29	30	128	88	86	1716	900	1887	202	265	
4	158	135	75	142	112	56	36	36	136	97	98	1710	904	1863	208	276	
8	160	133	73	140	103	50	30	29	127	94	94	1770	885	1844	199	276	
2	168	131	73	154	124	55	37	37	134	109	109	1780	860	1905	200	293	
5	154	127	82	133	112	49	33	32	140	93	93	1778	907	1875	199	263	
0	157	132	69	145	113	53	32	30	131	96	97	1812	901	1885	207	280	
6	158	127	67	145	120	50	37	32	140	98	95	1810	940	1802	199	263	
6	164	125	66	140	113	46	30	30	126	93	93	1690	878	1738	188	260	

No.	Name.	Age.	Locality of		Eye Colour.	Hair Colour.	Skin.	Nose profile.	Ears.
			Father's people.	Mother's people.					
25	Hernan, Colman,	23	Rusheen-namona	Rusheen-namona	hazel	brown	pale	straight	Outstanding
26	Geary, Patrick, .	30	Mweeniah	Mweeniah	green	dark-brown	ruddy	straight	Outstanding lobes attached
27	M'Cormick, Joseph,	24	"	"	green	dark-brown	ruddy	straight	Flat, lobes attached
28	Conneely, Michl.,	20	"	"	green	dark-brown	pale	aquiline	Flat, lobes attached
29	Mulkerrin, Thomas,	20	Carna	Moyrus	green	dark-brown	freckled	straight	Outstanding lobes attached
30	Curran, Martin, .	60	Mason Island	Mason Island	grey	dark-brown	ruddy	straight	Flat
31	Lydon, William,	20	Rusheen-amona	Ard East	grey	brown	ruddy	retroussé	Outstanding lobes attached
32	Kearney, Stephen,	70	Moyrus	Moyrus	grey	grey	pale	aquiline	Flat
33	Folan, Colman, .	30	Mweeniah	Glinak	grey	dark-brown	pale	straight	Outstanding
34	King, Patrick, .	57	Ard East	Ard East	grey	grey	pale	curved	Flat
35	Mulkerrin, Matthew,	30	Mason Island	Mweeniah	grey	brown	pale	straight	Outstanding lobes attached
36	Feeney, John, .	50	Rusheen-namona	Rusheen-namona	blue	reddish-brown	ruddy	retroussé	Outstanding lobes attached
37	Mulkerrin, John,	30	Callifeenish	"	green	dark-brown	ruddy	straight	Outstanding
38	Green, John, .	25	Mweeniah	Mweeniah	grey	dark-brown	ruddy	straight	Flat

CEPHALIC.		FACIAL.				NASAL.			AURICULAR RADII.			HEIGHT.		FORELIMS.		
	Breadth.	Face length.	Upper Face length.	Breadth.	Bigonial Breadth.	Length.	Breadth.	Internal Bi-ocular breadth.	Vertical.	Nasal.	Alveolar.	Standing.	Sitting.	Span.	Hand.	Forearm.
3	164	123	66	142	118	52	35	30	137	95	95	1700	875	1820	204	260
5	152	121	68	143	108	53	30	30	123	98	99	1750	872	1912	201	295
2	150	126	67	139	110	44	29	29	126	97	100	1607	863	1705	185	248
7	154	134	77	140	116	57	31	31	135	100	95	1751	915	1845	193	268
4	160	124	72	140	107	53	32	32	131	86	88	1681	867	1805	188	245
1	153	125	67	140	110	49	33	31	130	96	100	1576	835	1675	188	254
9	145	124	67	140	112	44	29	33	127	101	100	1664	885	1783	192	275
1	152	137	77	146	108	58	29	32	127	96	100	1757	903	1840	208	272
2	158	128	66	136	108	47	31	31	133	88	86	1555	850	1620	175	233
9	168	123	62	149	110	48	33	31	139	96	93	1718	917	1800	192	242
9	160	122	73	140	112	55	32	32	128	97	98	1745	880	1900	200	287
5	152	120	66	133	102	44	33	33	143	91	92	1678	850	1820	200	272
2	149	123	65	140	119	48	33	32	133	94	96	1655	892	1680	195	262
0	150	127	74	140	110	50	29	28	129	100	99	1597	845	1650	182	243

3. *Vital Statistics* :—

(A) *Population*.—On the whole, the population of this district has (like that of Gorumna and Lettermullen, but unlike that of most of our west-coast parishes) increased since 1851, though a falling-off is now apparent, evidently due to emigration. From 1851 to 1881 the population had increased from 7242 to 8858, but between that year and 1891 it had from emigration, declined to 7917, and the drain having continued, is now probably less still.

The districts specially worked have undergone about the same fluctuations as is shown in the subjoined table. In them there was an increase during the years 1851–1881, and a decrease in the decade 1881–91.

The proportion of males is rather larger than usual, the 7916 of the 1891 Census being made up of 4010 males and 3907 females.

District.	1851.	1861.	1871.	1881.	1891.
Mason Island, . .	74	84	110	127	118
Mweenish Island, . .	471	523	418	510	514
Ard East, . . .	199	176	173	138	117
Ardmore, . . .	143	221	255	317	277
Ard West, . . .	170	170	135	165	162
Carna,	94	87	174	189	168
Glinak,	172	141	131	164	75
Mace,	166	143	162	153	121
Moyrus,	100	127	98	130	118

(B) *Language and Education*.—Among themselves and in their every-day life the people speak Irish exclusively, and very many of them know no English whatever. It is quite common to meet not only old people but children and young persons who cannot converse in English. The rate of illiteracy is high, though probably much lower than it was at the time of the last Census in 1891. The subjoined table shows what the condition of the parish of Moyrus then was as regards illiteracy :—

Population.	Persons.	Male.	Female.
5 years old and upwards, . .	7305	3684	3621
Number illiterate,	3917	1744	2173
Percentage,	53·6	47·3	60·0

(c) *Health*.—I regret that I am unable in this case to give any full or particular information regarding the prevailing diseases, sufficient

material for such not having come under my notice during my stay in the district, and I had not the advantage of meeting the medical officer. The following notes, however, were made, based on personal observation and on inquiries made from persons who knew the district well. The population seems, on the whole, to be a healthy one in spite of its poverty and the nature of the dwellings and other adverse conditions. They seem to live to a good old age judging by the inscriptions on the tombstones.

Consanguineous marriages are said to be very common, and no doubt the strain was kept fairly pure by the difficulties of communication. I was unable to get any definite information as to the proportion borne by consanguineous marriages to all others, but note that at the present time it is rare to find any persons whose parents have come from outside their own townland; rarer still the cases in which the parents have come from outside the parish. There exists between the people the same likeness to one another previously noted in other secluded districts.

Insanity is not common. There are several cases of idiocy and 6 of deaf-mutism; 3 in one family on Mason Island. One of them is a dwarf and deformed (I have not seen him, but from what I heard it seems to be a case of cretinism). The prevailing diseases seem to be digestive troubles from the nature of the food, rheumatism, and respiratory diseases. Tuberculosis is said to be far from uncommon. And in this connexion Father Finlay says:—"Pulmonary diseases are rife in Carna, and to this outcome of this prevailing 'hardship' a large proportion of deaths are due. The wonder, indeed, is that a very much larger number of the inhabitants do not fall victims to phthisis and the allied diseases." Skin diseases are also common.

4. *Psychology*.—On this most delicate subject we shall say but little, as personal observation during a visit of limited duration such as this was is apt to be misleading in some things, and local information is often tinged one way or the other with prejudice. What is not put down here from personal experience is derived from informants who by daily acquaintance with the people and local knowledge were likely to be reliable, and the following account is believed to be accurate so far as it goes.

The people of this district, like those of all this coast, are shrewd and intelligent to a degree, and quick at taking up information. They are, however, largely bound by traditional ideas, and hesitate in many cases at doing anything out of the beaten track which their parents and grand-parents before them have followed. They are rather distrustful of strangers, especially at first, but are kindly and hospitable once this distrust is dispelled by further acquaintance. They are sober

and not given to alcoholic excess, and in sexual matters their morals are excellent, cases of illegitimacy now being very rare, only two having occurred in the past ten years. They are very excitable and easily moved. It is said that they are more given to work in spurts than in a regular steady way. This, however, may be due to the nature of their ordinary pursuits, which can only be followed at suitable intervals of weather and season. It is said to be characteristic of them that they would rather fetch a creel of turf three miles every day than go to the labour of building a stack of it near the house. As might be expected from the poverty of their houses and the nature of their work, they are not over cleanly in their habits. They are good and kind, if somewhat capricious, parents, and generous and helpful to one another in time of trouble or distress. They have been accused by some of being avaricious, but if this be the case it is not to be wondered at considering their poverty and the usual demoralising effect of seasons of relief and of the tourist traffic.

5. *Folk Names.*—The following list of surnames represents all those now to be found in the district. It has, however, no exceptional features, the names for the most part being common over the greater part of West Connaught, and thus vouching the almost unadulterated nature of the population.

Surnames of Persons who are Residing in Moyrus Sub-District.

Surnames of Persons.	Number of Surnames.	Surnames of Persons.	Number of Surnames.
Barrett,	3	Keaney,	5
Bullestrum, ..	2	Keely,	8
Burke,	10	Kelly,	6
Cafferky,	1	King,	17
Cannavan,	6	Kinton,	1
Casey,	1	Lyden,	5
Caufield,	1	M'Cormack, ..	3
Cloakerty,	1	M'Donagh, ..	24
Conneely,	20	M'Grath,	1
Conroy,	1	M'Hale,	1
Corbett,	2	M'Nally,	1
Cosgrove,	3	Manning,	1
Curren,	3	Mannion,	1
Earls,	3	Mongan,	2
Folan,	20	Mulkerrin, ..	8
Gearoy,	2	Navis,	1
Glynn,	2	O'Connor,	2
Gorham,	6	O'Donnell, ..	8
Greene,	19	Thomas,	1
Jennings,	2	Walsh,	4

*List of Surnames of Families, and number of Families of each
Surname in Carna Sub-District.*

Surnames.	Number of Families.	Surname.	Number of Families.
Barrett,	8	Keaney,	6
Berry,	1	Keely,	2
Brennan,	1	Kilmartin,	4
Burke,	8	Kineavy,	1
Carroll,	1	King,	4
Casey,	6	Lavery,	1
Clogherty,	13	Lee,	4
Conneely,	31	Lydon,	6
Conroy,	3	M'Cormack,	4
Conway,	1	M'Donagh,	6
Coyne,	4	M'Glue,	1
Curren,	8	M'Grath,	6
Devane,	3	M'Hugh,	1
Donohoe,	2	Madden,	5
Faherty,	1	Molloy,	1
Feeney,	2	Mongan,	2
Fitzpatrick,	2	Moran,	1
Flagherty,	2	Mulkerrin,	27
Folan,	17	Nee,	7
Gannon,	2	O'Brien,	2
Geary,	11	O'Donnell,	3
Geraghty,	1	O'Malea,	1
Gorham,	14	Reilly,	1
Greene,	19	Ridge,	7
Henue,	1	Shaughnessy,	1
Hernan,	5	Ward,	3
Joyce,	2	Walsh,	5
Keane,	3		

IV.—SOCIOLOGY.

1. *Occupations.*—The description of the mode of life of the people of Gorumna and Lettermullen answers fairly well as that of the life and occupations of the people of this district, with the exception that these latter are somewhat better off on the whole. The people of the islands, Mweenish, Fenish, and Mason, live mainly by fishing and kelp-burning, and have few cattle, and those of very poor quality. The holdings are very small, averaging for the district, about three acres under cultivation, and are much cut up by rocks and loose stones, and the soil is very shallow. The fields near the coast are of very irregular shape, and are bounded by walls of loose stones often made apparently to get the stones off the surface of the land. These loose stone walls have no gates, but in many cases a place of entrance or exit is provided by raising up two large stones as piers, so that the part of the wall between them can be knocked down when needful without damage to the rest of the fence. Farther inland the fields are larger, and are bordered by earthen fences. The surface of the fields is most irregular, often very wet, so that the potatoes seem in some cases to be growing in water which soaks the ground. Oats, barley, and potatoes are the principal crops, and the mode of cultivation is that described in the report on Gorumna. It is, perhaps, almost needless to state that spade labour is universal. The usual manure is "black-weed," which is brought from the sea shore in "back loads" by the women who join in all field work, and seem to be the hardest worked members of the community.

The people in Mweenish, Mason Island, and part of the coast line send their cattle up to the inland mountains and moors every summer and autumn as there is no food for them at home, and the watchers who stay to tend these cattle build for themselves small huts (boolies) of stone or sods and roofed with scraws in which they live for the season. These boolies are very similar to those built on Inishglora by the lobster fishers of Inishkea (for a description of which see the report on the Mullet and Inishkea islands). The owners have to walk about five miles or so every day in order to get the milk. The cattle are small and of a poor description. The fowl, cattle, and pigs are brought into the houses at night in the winter. Very few pigs seem to be kept, and only a small proportion of families own a horse or donkey. Small patches of osiers are grown in moist places near most of the houses to supply materials for baskets, panniers, lobster pots, &c.

The principal source of money for the coast and inland proper is

kelp burning, and a good deal is still made here though prices are smaller than they used to be some years ago. The price varies with the quality of the kelp from about £1 10s. a ton to £4 10s. It sells for a higher price in the spring than in autumn. A family makes about four or five tons in a season. The implements used are those described in a previous paper, but one not previously noted was observed in this district—a wooden kelp-hook for gathering weed—probably a survival.

Besides kelp burning the islanders and coast people fish both for home use and for market. The people along the coast of the mainland take lobsters which they dispose of for from five shillings to ten shillings a dozen, according to season and quality. The lobster pots are made from the osiers referred to above. The islanders fish for mackerel and herring, for which they find a market at Aran and at Roundstone. Some coarse fish is also caught, chiefly glassan and bream, and roughly salted and dried for winter use.

There is no regular employment for labourers, and there is little or no migration of labourers from this district to England or Scotland.

Trades are few, there are some village weavers and blacksmiths, and a few boat builders. In connexion with the last named occupation it may be stated that we saw several excellent boats of local make, including one ordered by the Congested Districts Board, and of considerable size. When the wind is strong a wind screen of wood is sometimes put up by boat-builders to prevent their work being upset and boards being blown away. There are some good shops in the village of Carna. The women's occupations are many and various; besides attending to household affairs, cooking, &c., they card and spin the wool for the homespun clothing, keep fowl, the eggs 'of which they barter at the shops for groceries and other goods. They gather carageen moss from the rocks at low water which they sell for sixpence a stone (a stone can hardly be gathered by one woman between the tides). Besides all this they help in all field work, and carry on their backs loads of sea-weed for manure, and of turf from the bogs inland for fuel. During the winter months there is very little work of any sort done with the exception of the making of drains.

2. *Family-life and Customs.*—The life of the people is, as before observed, somewhat similar to that of their neighbours of Gorumna and the adjoining island, and the one description answers fairly well for both, with the exception that the struggle for existence does not appear to be quite so severe in this district, though the poverty is still great. The children of a household, usually numerous, have early to take part in

the work of the family and help in various ways, hence their school-attendance is often irregular, as they are frequently wanted at home to take their part in various kinds of work. They leave school early, at about fourteen years of age, and then enter at once into the struggle for life as grown-up people, and may either emigrate or stay at home to continue the same style of life as their parents before them. They marry early and the matches are, as a rule, arranged by the parents there being no previous courtship. In some cases, however, the young couple who have had a fancy for each other, and whose parents would not consent to the match, have been known to elope together to the mountains, so that the marriage had to be consented to by their parents. These cases, however, were extremely rare. Monetary considerations are usually the chief matter attended to in the concluding of a match. A fortune is expected with the bride, and the groom receives a "stripe" of his father's holding on which a new house is erected for him. The last son left at home shares the house with his parents, and brings his wife home to them. Men marry at a very early age, some even at sixteen years old, usually under the age of twenty-four. Girls are marriageable from fifteen years and upwards. The customs relating to infants are practically the same as those described in the report on Gorumna.

After a death the body is usually kept for two days before burial. Wakes are held at which most of the old games are still kept up, but whiskey is now seldom provided, porter taking its place. Relatives and neighbours will not do any work from the time of a death until after the funeral as a sign of respect for the deceased. On reaching the graveyard the coffin is carried once round the enclosure before being borne to the place of interment; formerly it was the custom to bear it thrice, but this has ceased to be the case for some years back. As is usual in the west the grave is not dug until after the funeral has reached the graveyard. Pipes and tobacco are usually served out at the cemetery, but the custom of putting pipes on the grave does not exist here. The *caoine* is to be heard at all funerals here.

When the grave is filled in it is covered by a flat topped heap of stones or cairn, and the corner stone of an old church is said to be valued as a headstone. A cross of wood or stone is usually erected as a memorial, and the graves of the better-to-do people are often covered by a flat covering stone bearing devices of a religious nature, and the usual inscriptions.

The people as a rule rise early and work hard if somewhat irregularly.

3. *Food*.—The dietary consists mainly of fish (fresh or dried), potatoes, Indian meal, soda bread and tea. Flesh meat is very rarely used. The potatoes being grown in such wet ground, seldom last beyond December, and then recourse must be had to Indian meal and flour. Tea is taken at every meal, and is drunk very strong; as it is usually "stewed" or overdrawn it is not by any means wholesome.

4. *Clothing*.—The clothing of the men is of the usual Connemara type, and is almost entirely of homespun. That worn on working days is usually made of whitish flannel, without dye, and is often very ragged and much patched. A better style of attire is worn on Sundays and holidays, and the favourite material is a natural grey tweed undyed, made of black and white wool, the warp being white and the woof black. This material wears well and does not fade. Soft felt hats and cloth or tweed caps (both imported) are much worn, but many of the men and boys still wear the flat home knitted cap of "Tam O'Shanter" pattern. Few dyes are used except *scra clogh* made from a lichen (*Ramalina scopulorum*), with which stockings are dyed a brownish yellow; it is believed that stockings dyed with this material, prevent the feet from sweating or chafing. Heavy boots are worn at all times by the men and by the women on Sundays and holidays. The people as a rule are very heavily clothed, though the garments are often very old and ragged. Skirts and underclothing are of flannel, home or factory made.

Young boys wear the long frock or kilt, as described in the report on Gorumna, until the age of thirteen or fourteen years, and as a rule go barefooted and often bareheaded as well (see Plate xxx., fig. 2). In cold weather the children are decidedly underclothed; hence, as the Rev. T. A. Finlay describes, they are usually to be seen on a cold day sitting "in the ashes with their bare legs within a few inches of the glowing coals."

The dress of the women is mainly composed of homespun materials and consists of a bodice and skirt of red (dyed as a rule with imported madder), a little red tartan shawl over the shoulders, or sometimes a bawneen or white flannel jacket thrown over the shoulders and fastened in front by the arms. In showery weather a white or red flannel petticoat is worn as a cape (Plate xxv., fig. 2). As before stated, the women usually go barefoot on week-days, but many wear mittauns, or footless stockings.

5. *Dwellings*.—The houses vary much in type; in the villages and along the main roads there are some comparatively comfortable cottages and houses built with mortar and whitewashed or plastered, but these are

not typical. As a general rule the houses on the islands are better than those on the stony hills on the mainland, which are very primitive. There are exceptions to this, however, as examples of the most primitive type of house yet met with in the course of these surveys are to be seen on the islands of Mweenish and Mason; these are dug out of the sandhills and lined with walls of dry stone; the roof is low with scarcely any pitch, and the walls rise above it to the height of two or three feet to prevent the strong gales of autumn and winter from blowing the thatch away. There is no window, a space a foot or so in height being left at the top of the door to admit light and air. The appearance of these houses will be best understood by a glance at the photograph (Plate xxiv., fig. 2) of a house on Mweenish. These houses are of small size, about 10 feet by 8 feet, and consist of only one room.

As a rule the dwellings are primitive, and much resemble those seen in Gorumna and Lettermullen. Whenever possible they are built on a flat of bare rock to afford a sound dry floor; if this is not available the floor is flagged, and there is a paved causeway around them. The older houses consist simply of one room and are built of dry stone and plastered inside. In some cases the wall is only raised to a certain height all round, the gables being built of turf; they have no chimney, the hearth being built against the gable wall and the smoke escaping through a hole in the roof, through which the ridge pole passes. Glazed windows are often absent, their place being taken by a hole in the wall closed by wooden shutters.

The roofs are low pitched and thatched, the rafters and couples are of drift timber, and the thatch which is laid on as usual over "scraws" is of straw, sedge, and even in some cases, apparently of hay, fastened down by "sugáns" to pegs driven into the walls.

The furniture is very rude and scanty, and many houses like those in Gorumna and Lettermullen, have no regular beds in them. This description of course only applies to the very poorest class of dwelling which, however, forms a considerable proportion of the houses in this district (Plate xxiii., fig. 1).

The second and better class of house is much larger, and has a sleeping room partitioned off, and glazed windows which, however, are seldom made to open. It may or may not have a regular stone chimney. The kitchen is entered by two doors opposite each other, the one on the side sheltered from the wind being kept open during the day for air, light and the convenience of the inhabitants, human and others. The cattle are taken into the house at night and the fowl roost on the "couples," and there is sometimes a pig-stye outside the house,

in other cases the pig is taken into the kitchen. The sleeping rooms are small and dark and ill ventilated. The furniture is scanty and poor, and consists of a rough deal table, a chest or two and some stools and forms, a rude dresser with some coarse delft ware, a chair or two, a griddle, a pot, and perhaps a spinning-wheel.

The sleeping room contains a bed or two, the bedsteads of drift timber and the beds stuffed with straw. There may be a chest and a stool or chair. As might be expected under such circumstances, domestic cleanliness and comfort are not at a very high level, and the sanitary condition of the houses leaves much to be desired. There is a still better class of house of more modern type which is built with mortar, has windows and chimneys, is whitewashed outside and much better furnished inside, cleaner, and the pigs and cattle are not taken into the house, but these being wholly modern do not require closer description (Plate xxiii., fig. 2, Plate xxiv., fig. 1).

The Rev. T. A. Finlay, to whose article on this district I have previously referred, thus described the sleeping arrangements in the poorer houses:—"Beds are a rare luxury; a truss of straw or dried sedge on the earthen floor usually takes the place of a bed, and the clothing worn during the day, supplemented in some cases by disused guano sacks, form a substitute for bed-covering. On this couch the sleepers are disposed with their heads close to the fire, their feet extended towards the door. The hygienic merits of these devices I will not undertake to estimate. I can, however, assert that they do not avail to prevent the ailments which damp and cold produce elsewhere."

6. *Transport*.—As good roads are of comparatively recent date in this district, wheeled vehicles are quite of modern introduction, and are but few in number. In former times the sea formed the real highway for the people of these regions, who were largely cut off from the outer world by the broad belt of wild uninhabitable land and mountain, and mostly lived, as is still the case, along the coast line. Even now there is almost no population at a distance of more than a mile from the sea shore. Boats then formed the chief means of communication with other places. The older roads were mere bohereens seldom more than four or five feet wide, very rough, and uneven (Plate xxiv., fig. 1), so totally unsuited for carts; besides, the narrow, irregular arms of the sea and muddy creeks were altogether impassable for vehicles of any sort even if the people had been well enough off to have possessed them. Now, though good roads have been made, and more are being made through the districts, and the island of Mweenish has been connected to the shore by causeways (built about six or seven years ago), there is still but little

wheeled traffic, and the bulk of the people depend for transport of their fish, manure, turf, or farm produce upon their own labour, carrying all these articles in baskets on their backs, for, with the exception of a few donkeys used for carrying panniers, beasts of burden are conspicuous by their absence.

The boats used are heavy wooden kelp boats, hookers, and pook-hans. There are no currachs, as the coast is said to be too rocky for them.

V.—FOLK-LORE.

Whatever its poverty in other respects, and probably on account of that very poverty and backwardness, this district is rich in its folk-lore. Legends, traditions, old songs, &c., are to be heard at the winter fire side, and many old customs are kept up which have died out elsewhere. It is by no means easy, however, to obtain much information on these points, and a special search for it would have taken up much more time than was available for the whole work. The people are naturally reticent on this subject, especially with strangers. The following notes, most of which relate to minor folk-lore, were obtained, however, largely through the kindness of Mr. P. Mongan of Carna, and Mr. Cahill, foreman of the works at Mace Harbour, also some other informants whose names I withhold by request.

1. *Customs and Beliefs*.—There are many old customs still kept up, though others have become extinct, and some of those still existing are modified.

Belief in the "bad eye" is widespread, and in praising a child or an animal it is customary to say "God bless it" to avoid any suspicion of having "overlooked" it should any evil afterwards occur. When entering a house where a person has met with any accident, people spit to avert the action of the bad eye, lest that should have been the cause of the injury. Beltane fires are still lighted. The people dread being out after dark, and carry a coal of turf if necessity requires that they should go, as a protection against ghosts and fairy influences; and there are many beliefs still remaining about the occult influence of fire and its power to dispel enchantments. Men sometimes take a coal with them when fishing to bring luck.

It is thought unlucky to give fire out of a house in which a person lies sick. There is a lingering remnant of the ancient belief in the magical power of blacksmiths, for which reason they would fear to take anything surreptitiously from a forge. There is great faith in

omens and portents, and large numbers of actions are unlucky, such as meeting a red-haired woman on going out in the morning, &c. It is believed that the spirit of the person last buried in a graveyard has to watch until the next funeral, and in consequence of this belief serious quarrels have occurred in past years when two funerals met at Moyruss graveyard. Boats passing St. MacDara's Island lower sail in salute, and it is believed that some misfortune would occur to someone in the boat if this were not done.

Ghosts are fully believed in by many, and tales are told of several supposed to be seen in the district. These apparitions are not always human, as a spectral horse and a black dog are both believed to haunt some spots. Two of the ghost stories of this parish relate to the R. I. C., two members of this force who met with untimely ends being said to revisit the scenes of their deaths. In one case the spectral policeman appeared on Lough Skannive in a boat which was seen to sink with him. In the other case the ghost was said to have been seen in the police barrack.

Fairies are believed in by most of the people, and the usual story as to their being fallen angels told as to their origin. They are believed to play many mischievous and spiteful tricks, to cause diseases in cattle, and to change infants, who are consequently carefully guarded against this evil. The old belief referred to by O'Flaherty anent the connexion between people of the name of Conneely and seals is still in existence in this neighbourhood.

The people at Mace are said to have a vague sort of belief in mermen and mermaids.

2. *Charms and Leechcraft.*—Charms are believed in and practised for the relief of many minor ailments, but beyond the fact that they are used little information could be got except that "head measuring" for a headache is practised here as well as in the other districts reported on. There is said to be an old woman in Kilkerrin who treats disease and "evil influences" by these means. We met one instance of the "cashlaun" fishing spell, described in a former paper (Plate XXIII., fig. 2).

Spittle, especially "fasting spittle," is believed in as an application to injured parts.

A good many herbal remedies are still in use.

3. *Legends and Traditions.*—Many ancient legends and traditions are still held in memory by the older folk, but of these we were not able to get any except a couple of minor examples.

In the neighbourhood of Ard the memory of the chief Teige na

Booly O'Flaherty who once held the castle there (in 1585 and later) is still held in detestation as that of a tyrant and oppressor. He is said to have allowed no turf to be cut within seven miles of his castle, and to have poisoned the lake near it which killed all the fish.

A couple of variants (apparently) of the same legend were obtained about St. Mac Dara's Island.

One is that having cows on the island but no bull, the saint prayed earnestly for one, which came up out of the sea to him, and on landing left marks of his hoofs on the rock which are to be seen to this day for the confusion of the incredulous. The other story or version is that St. Mac Dara had a neighbour, St. Coelan, who lived on Cruagh na Kily or Deer Island, some six miles distant, who was not at all on friendly terms with him owing to some argument which had arisen between them (the legend does not say whether this argument related to theological subjects), and this saint resorted to a curious and very unsaintlike mode of getting the best of the argument by taking advantage of the fact that St. Mac Dara had only ewes on his island, and making use of a marvellous ram of his which he caused to leap over to Cruagh Mac Dara at one bound and serve the flock.

There is another and sadder legend connected with Deer Island and the heaps of stones there which are said to cover the bones of people who died there of starvation. This legend is given at full length in a footnote to p. 102 of "O'Flaherty's H'Iar Connaught."

VI.—ARCHÆOLOGY.

This district is fairly rich in antiquities, especially in the survival of the use of many primitive articles and implements, which have remained here unsuperseded, owing to this part of the coast line having been, until within comparatively recent times, largely cut off from the outer world by the absence of good roads through the belt of desolate country inland and the absence of proper means of conveyance. These being now supplied, many of the implements formerly in common use are being rapidly superseded, while some have already disappeared owing to the substitution of imported manufactured articles for home made ones. The ancient monuments and buildings are not very numerous, but are interesting. These I do not feel myself competent to describe, as I cannot pretend to any special knowledge on the subject, but my friend Mr. T. J. Westropp, to whose kind assistance in the work of this survey I owe much, has supplied this deficiency, and the section on Antiquities given below is from his pen.

1. *Survivals*.—The dress and dwellings of the people present many examples of survivals, both in form and materials, and in the implements used on them. Amongst these may be noted the homespun clothing almost entirely made of undyed wool, the kilt-like garment worn by the young boys, and the flat caps of Tam O'Shanter shape, still worn by many of the men, which, with the trousers of undyed flannel, reminds one of the description of the men of H'Iar Connaught in their "flat caps and trousers," who entered Galway in the year 1641. In connexion with the homespun are the implements for its manufacture: cards, wool-wheels, warping frames and looms, all still in common use.

Many of the houses are of very poor and primitive type, and among these there are a couple (Plate xxiv., fig. 2) dug out of sandhills, as described in an earlier section of this paper, and probably the very poorest class of permanent dwelling in use on our Western coast. Mention has before been made of the temporary sheds or boolies built for sheltering those who go to the mountains to take charge of cattle there.

Querns are still used in some few of the houses for grinding barley, and probably for another purpose in some cases. The baskets and panniers used for the transport of fish, seaweed, &c., are also survivals of the time when there were no wheeled vehicles in the district.

2. *Antiquities*.—The scene of these investigations lies in the parish of Moyruss (Magh ruis, plain of the point).¹ This division extends over so large a tract of wild and almost impassable country that, even from its appearance on the map, we might suspect that when the church divisions were made the population was as scattered, and perhaps more scanty, than at present. The smaller parishes were usually the most thickly populated in earlier times.

This view is supported by the archæology of the parish; forts, castles, cromlechs, and even graveyards are conspicuously absent in some districts, and few in number anywhere, and in the part of Moyruss extending from Mace to Lough Skannive and the adjacent islands, we only found two or three "stone crannoges" or fortified islets, five holy wells, five graveyards, four churches and sites, and the foundation of one castle, a striking contrast to the ruin-crowded Burren in county Clare, where we had recently been staying. The churches are at Moyruss and St. Macdara's Island, which we must describe more fully. A ruined chapel stood on Mason Island, and St. Keelan's church on

¹ Ordnance Survey of Co. Galway, sheets 63, 76, and 77.

Croaghnaakeela Island. The graveyards are—one for children and strangers on Finish Island to the east of Mweenish Bay; one on Mweenish Island, or rather peninsula, for it is connected by causeways and the islets of Carra, Joyce's Island and Rushenacholla to the mainland; Mason Island near the chapel, St. Macdara's Island and Moyruss church. The wells are Tobergollan, Killane, and the "Well of the Seven Daughters" on Mweenish, Tobermacdara in St. Macdara's Island, Toberkeela in Croaghnaakeela, and Toberkenagh north from Moyruss church. There are fortified islands at Lough Bola and Lough Skannive, the site of a castle at Ard East, and a ruined late "telegraph tower" on the ridge of Cuillen, between Ard and Carna. To this list may be added the following "leachts" and "stations":—Mason Island; three on Croaghmacdara; and Lackshinnagh and the leacht of St. (Sinnagh) Macdara on the shore of the beautiful bay north of Moyruss church.

Croaghmacdara or St. Macdara's Island has long attracted the interest of archaeologists. Roderick O'Flaherty, in "*H'Iar Connaught*," in 1684, thus notes the spot—"Cruagh mhic Dara, a small high island and harbour for ships. This island is an inviolable sanctuary, dedicated to St. MacDara, a miraculous saint, whose chappell is within it, where his statue of wood for many ages stood, till Malachias Queleus, the Archbishop of Tuam¹ (1631–1645), caused it to be buried underground for special weighty reasons." In face of the mention of such wooden statues of the saintly founders of churches by Giraldus Cambrensis, the existence of figures of SS. Molaise and Brendan at Inishmurray and Innisglora, and the figure of that nameless saint, perhaps Senan or Senach, brought from county Clare to Kerry in the last century, it is interesting to note that a wooden image, "many ages" old in 1631, was revered, as it is a favourite theory that such images were figureheads of the Spanish ships wrecked on this merciless coast in 1588.

The "*Chorographer*" then tells us of the "captives' stone," where women gathered "dulseag, for a friend's sake in captivity," to get the succour of the saint, and how mariners used to "bow down their sails three times as a mark of reverence when passing between Mason Head and the island." He corroborates this statement by awe-inspiring tales how a captain of the garrison of Galway, so late as 1672, neglected this salute, and met such a storm that he vowed never to pass without paying his "obeysance." His tardy repentance did

¹ Malachi O'Cadhla, a native of Co. Clare, Roman Catholic Archbishop of Tuam.

not, however, save him—*tantsene ira?*—"he never returned home till (*sic*) he was cast away by shipwreck soon after." Another Galway man named Gill deliberately committed the same offence, "when, sitting on the pup of the boat, the mast broke and struck him on the pate dead." Mr. Westropp remembers in 1878 a salute being given at Macdara's Island, but he thinks it was with oars and not with the sail, though his party was in a becalmed hooker.

It is not a little curious, as noted in the Ordnance Survey Letters of Galway, that despite this deep reverence for St. Macdara, "the marines (*sic*) of this western coast" regard his personal name (Sinnach, the fox) as most unlucky. If they see a fox, hare, or rabbit, dead or alive, or even hear the animal's name, they would not venture out to fish that day. The author thinks they would "unsaint" MacDara if they knew his name was Sinnach, and anyone bearing any of these names is obliged to change them on settling in the neighbourhood.

O'Flaherty's notes on the fishery, from trout to seals, are worth the study of our naturalists, but can only be noticed in this paper. No doubt in 1684 the "waste islands" may have been "all covered over with birds' eggs far more delicate than any laid by poultry. Here is yearly a great slaughter made of seals about Michaelmas on wild rocks and waste islands of the sea," but we hesitate when we read of black "ambergrease" thrown up in large quantities by the sea, or of "eighteen *porcupines* that were in pursuit of the salmon fish." Perhaps like his "crocodile" in Lough Mask these statements sprang from defective instruction in natural science. At present the natives fear to kill a seal lest it should be one of the Conneelys, a number of whom are believed to have once suffered this metamorphosis.

St. Macdara's oratory has been figured by Petrie in his great work, and is described at some length by Mr. F. J. Bigger in a valuable and well illustrated paper, published in the *Journal of the Royal Society of Antiquaries of Ireland*.¹ We need therefore only briefly observe that it is a small oblong building 14 feet 8 inches by 11 feet 3 inches, the west door having inclined jambs, and the small east window having its semicircular head scooped out of a single block. The window has a flat top, and like the east is deeply splayed. A curious feature in the building is that the slightly projecting *antæ* are continued by a projection following the line of the gable.

The stone roof has for the most part fallen; it was formed by 17 rows of slabs, and an enclosure of two large slabs at the east end is

¹ Vol. vi., ser. v., xxvi. consecutive, p. 101.

shown as the saint's bed. The structure is unfortunately decayed and the south wall injured; little would get it into secure repair, and this little, in justice to posterity, ought to be done. There are some remarkable carved stones; the "Saints' stone" was found by Mr. Charles Elcock in 1884. Its head is cut so as to form two bold "scallops"; in the centre is a bald and bearded head in high relief, surrounded by six bosses decorated with raised crosses, knots and frets. Several stone altars remain surmounted by crosses; the north-east cross is fairly perfect, with a tapering shaft and a round unpierced head. Another cross is richly carved, it has squares at the centre and ends of the head, foot and arms, and is enclosed by a circle. A third is boldly cut in relief, the base has a key pattern; the fifth is a great cross, 6 feet 6 inches high, it had expanding arms and head and a circle; there are also fragments of another richly carved encircled cross and of some circular cloghauns.

The parish church of Moyruss (Plate xxv., fig. 1), though late and of little interest compared with the last, is worthy of a visit. It is finely situated, near a beautiful strand, on Roundstone Bay, with a noble view of the Twelve Bens. It is oblong in plan, and measures internally 18 feet 10 inches by 39 feet. The east window was broken, even in 1838; it was originally glazed, and is $8\frac{1}{2}$ inches wide. The north wall is featureless, save for the lower stones of two inclined jambs; the west gable is also blank, save for an ambrey 2 feet long. The south wall has a beautiful late door, round-headed, and recessed, of two orders, the edges neatly moulded, with leaves at the ends of the mouldings and stop-pieces inside, the piers being chamfered. The outer face was intact in 1838, and a sketch appears in the "Letters" it has since fallen, and only the inner face remains. The south window is oblong and plainly chamfered; the walls are coarsely built of granite and quartzite, 33 inches thick; the west gable and S.W. corner are much shaken. The Lackshinnagh lies to the north towards the shore; it is mentioned by O'Flaherty, in 1684, as being kept in the church at Moyruss, dedicated to the saint Sinnagh Mac Dara, where his festival was kept on July 16th.

We did not visit Croaghneakeela, nor could we find any description of its church; the Ordnance Survey letters imply that it has vanished, and that only some cairns remain, said to be over the graves of some persons who died of starvation. Of the castle near the creek at Ard east, only foundations remain.

St. Colan's day was kept at Moyruss on February 3rd.

We saw no forts, cromlechs, or pillar stones, though the place

abounds in loose blocks very suitable for their construction. The only ancient habitations discoverable are the fortified islands. That in Lough Bola has been noted and sketched by Mr. Kinahan, but he informs us that the engraver took unwarrantable liberties with his sketch, and the structure, a small islet fortified with a strong wall of dry stones, certainly presents a very different aspect at the present day.¹

The Lough Skannive dwellings were first described by Colonel Edgar L. Layard in 1896.² After commenting on the above view of the Lough Bola 'crannoge,' and describing it as "small and nearly round, and the walls so low that an ordinary man standing in a boat can look over them," he goes on to describe the one in Skannive, so far as we could judge from the nearer shore, very accurately. It is locally called "the Castle," and is roughly oval in plan, 50 to 70 feet across; there is a small 'dock' for canoes on the side farthest from the nearer shore. The walls are of dry stone, rising about 10 feet above the ordinary water level and going down a few feet below it; they are 3 or 4 feet thick and overgrown with brambles, rowans and other plants; the face is backed up with loose stones and slopes slightly inwards.

Farther up the Lough is another dwelling; the builders took advantage of a group of rocks which they walled up in places; it is also closely overgrown.

Others in a dilapidated state remain in Lough Sheedagh, near the lower end of Skannive and Keamnacally Lough, less than a mile from Carna Hotel.

On the moor near Loughs Sheedagh and Skannive are some "stone mounds"; tradition varies among the fishermen as to whether they are the graves of the men who built the "castle" or of the ubiquitous soldiers of the dreaded Cromwell.

VII.—HISTORY AND CONCLUDING REMARKS.

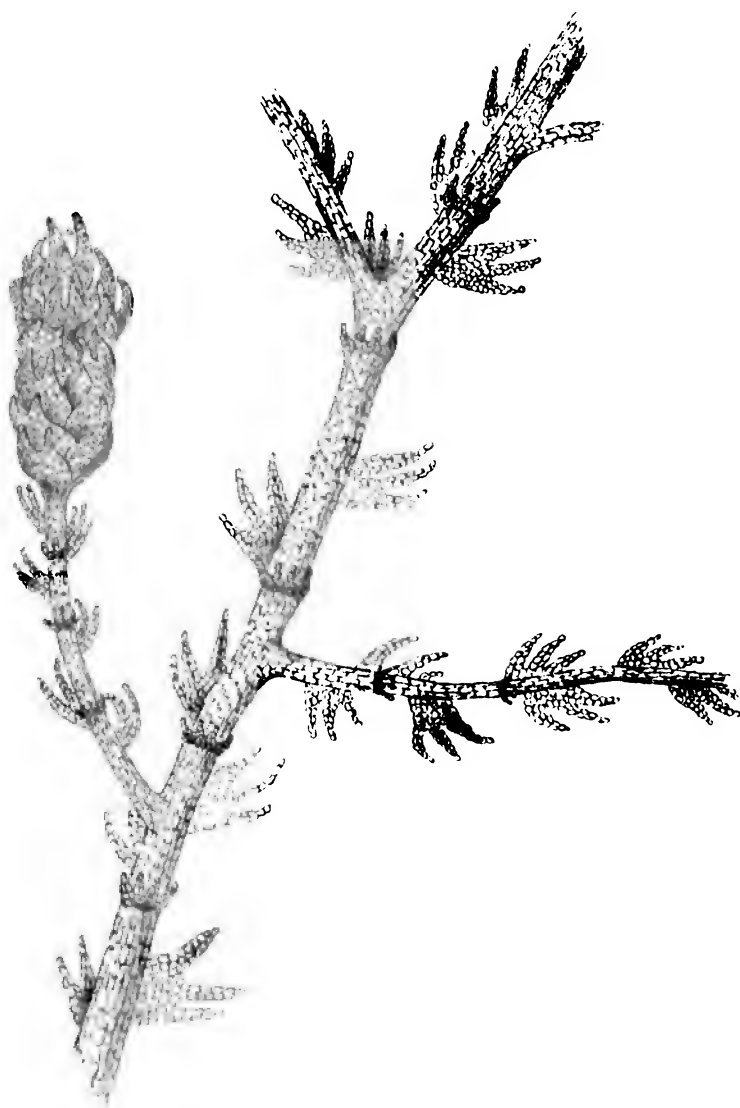
The history of this district may be described in a very few words as simply that of a very remote and thinly populated portion of Iar Connaught, the territory occupied by the O'Flaherties and allied tribes after they had been driven westwards out of the more fertile districts—the Barony of Clare—by the Norman invaders. Beyond the

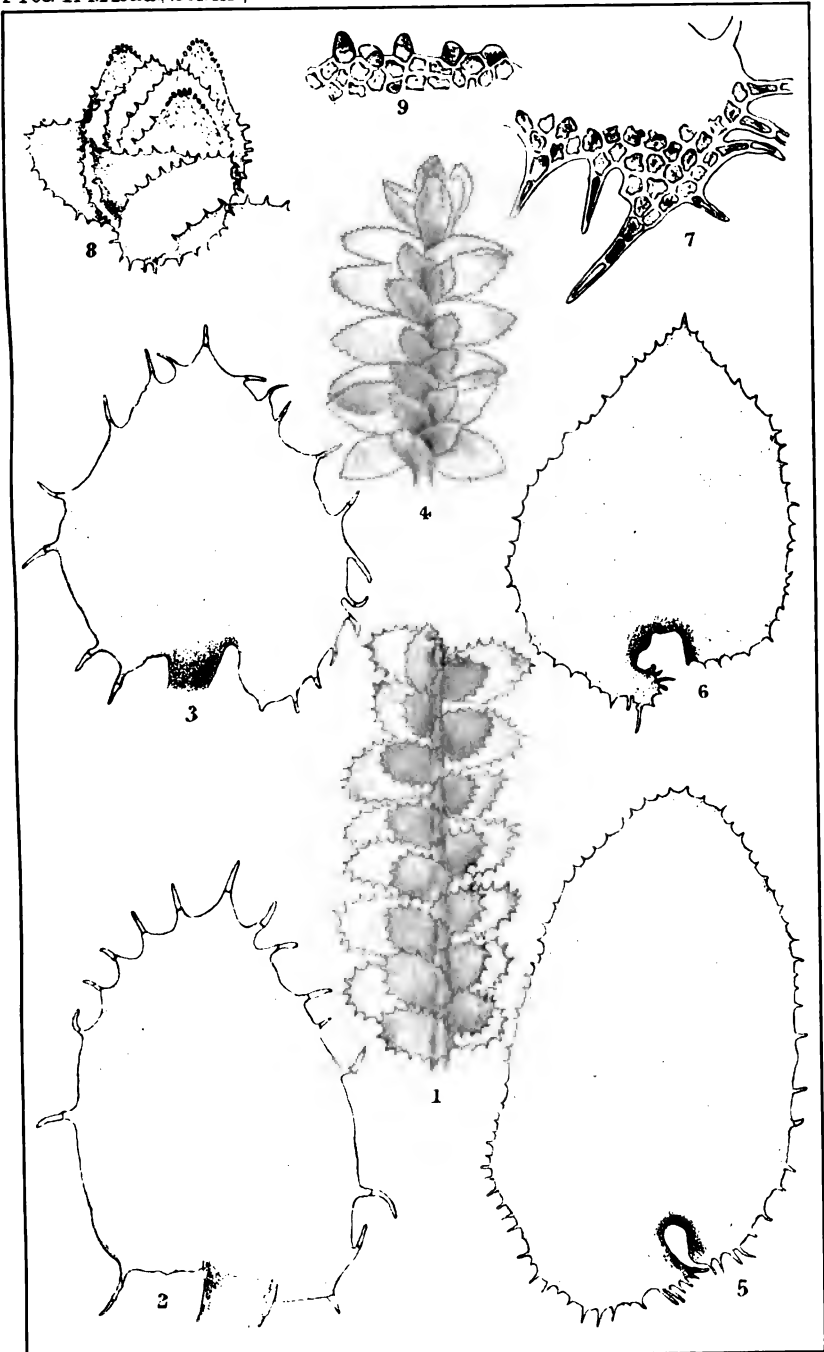
¹ *Journal*, B.H.A.A.I., 1872, p. 11; *Journal*, R.S.A.I., vol. xxvii., 1897, p. 373, p. 438.

² *Journal*, R.S.A.I., vol. xxvii., 1897, p. 373.

few references to some of the churches, &c., quoted by my colleague, Mr. T. J. Westropp, in the preceding section, the only mention of this district I have been able to come across are in the notes to O'Flaherty's *H'Iar Connaught*, in which a quotation from the Indenture of Composition states that in 1585 the castle of Arde was held by "Teige Ne Booly" (*buile*) O'Flahertie of the Arde, otherwise called O'Fflahertie of both Con O'Manice (*Connemaras*), and from an inquisition taken in 1607 he still ruled there. This Teige na buile is still famous in local legend as a tyrant. The district can thus be said to have really no history, apart from that of the district (*Iar Connaught*) to which it belongs, and I can find no record of any influx of people from other districts to alter the old strain, and indeed there would be little to tempt them to such a barren district.

Father Finlay, to whose excellent article on this region I have before referred, thinks that the congestion of the coast districts is of recent growth, not more than a century or so.

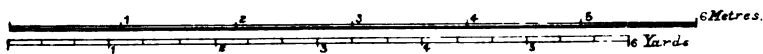
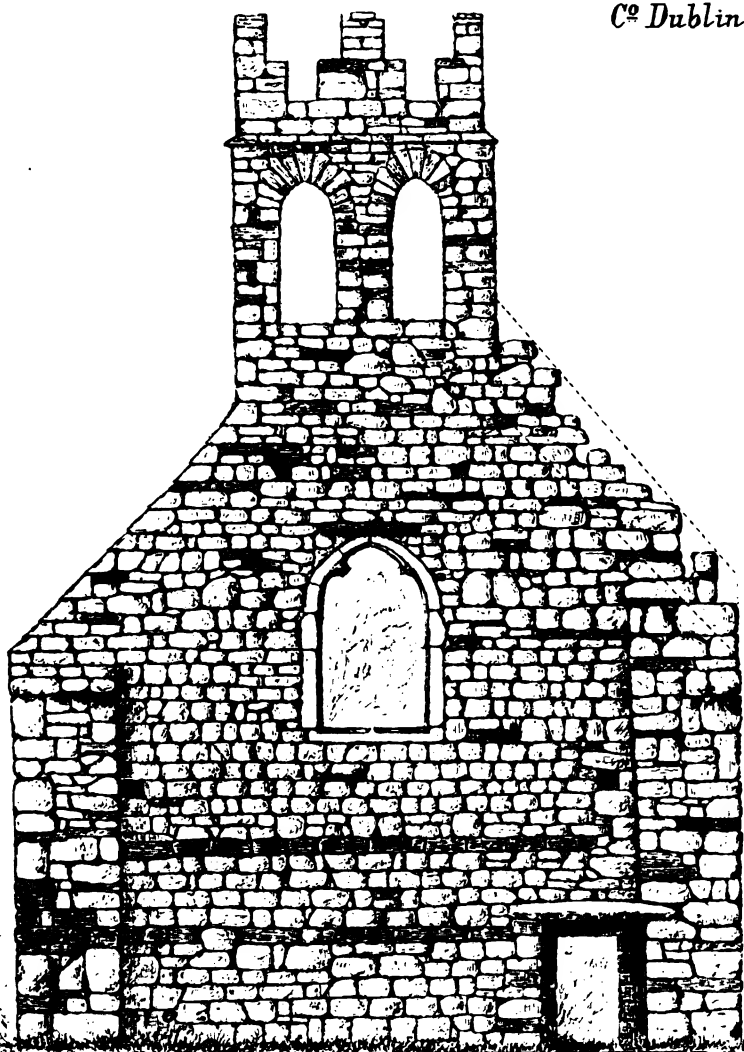






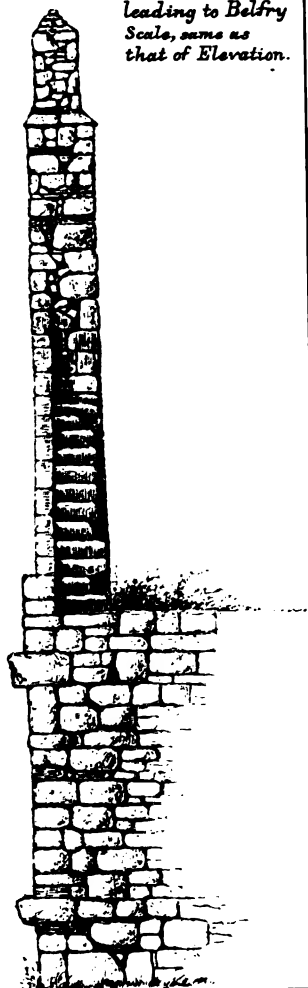
NEOLITHIC BURIAL, WHITEPARK BAY.

*W. Elevation of
S^t Begnet's Church
Dalkey
Co^y Dublin.*

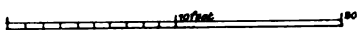


*S. Face of W. wall of
S^t Begnet's Church
Dalkey
C^o Dublin*

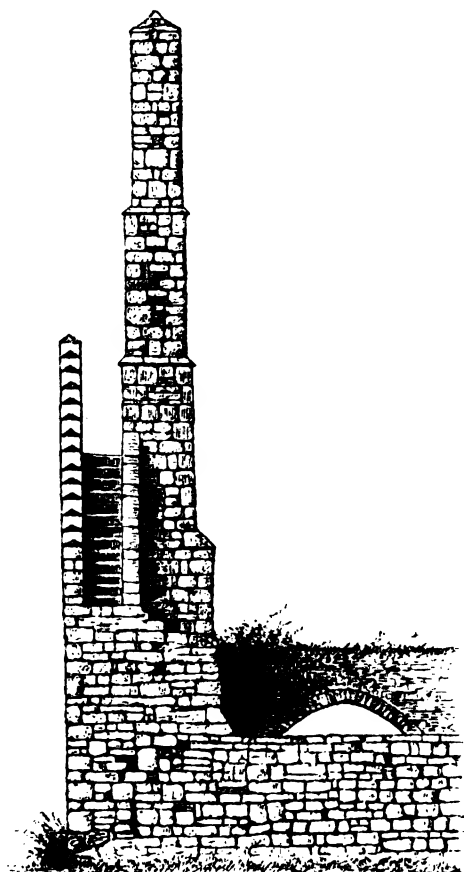
*to show steps
leading to Belfry
Scale, same as
that of Elevation.*



*S. Face of W. wall of Howth Abbey
showing steps leading to Belfry.*



*From the Journal of the Royal Society of
Antiquaries of Ireland 1896, p.4.*





GROUP OF MEN AT CARNA.



GROUP OF MEN AT CARNA.



GROUP OF MEN AT MACE.



DRESS OF BOYS.



HUT NEAR MACE.



HOUSE AND FISHING SPELL, MWEENISH.



HOUSE AND BOHEREEN, MWEENISH.



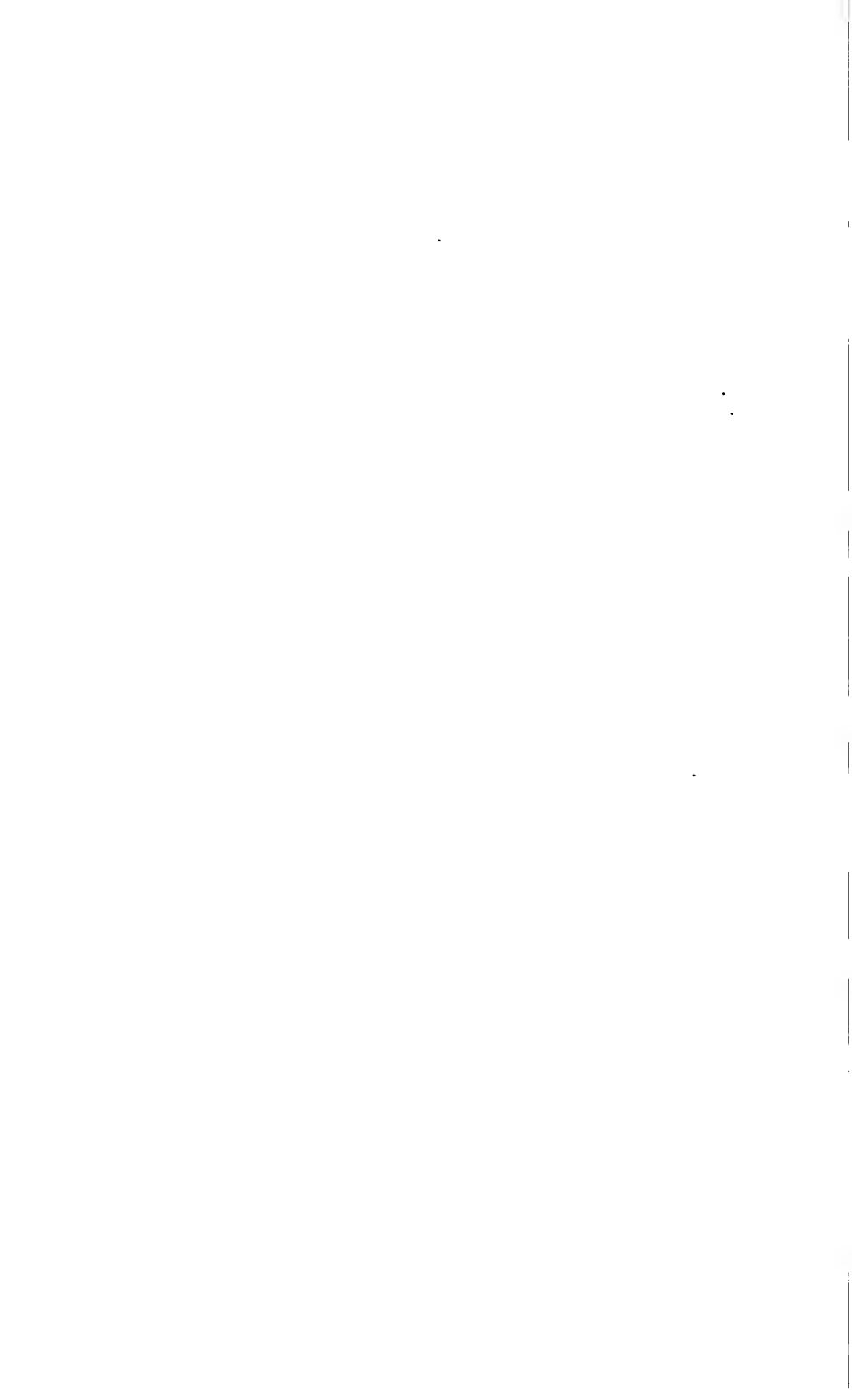
"DUG OUT" HOUSE, MWEENISH.

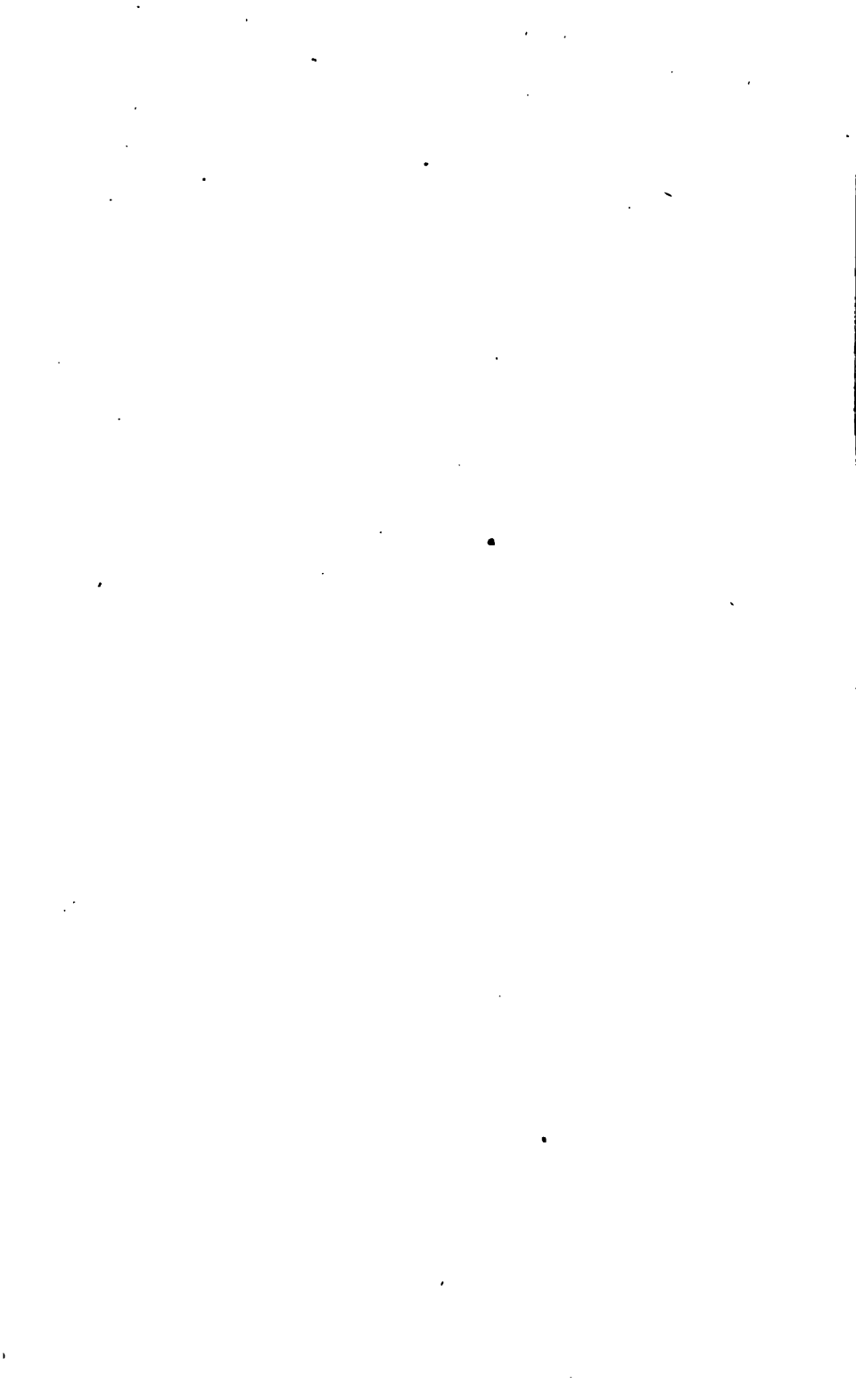


MOYRUSS CHURCH.



WOMEN, CARNA.



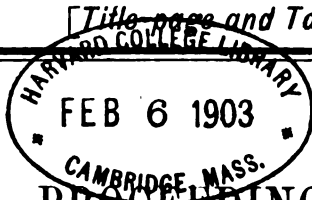


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JULY.]

[1902.]



PROCEEDINGS

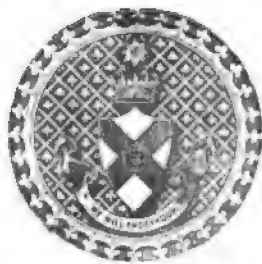
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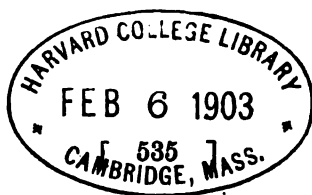
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XXVIII.

A LIST OF THE BEETLES OF IRELAND. BY REV. W. F. JOHNSON, M.A., F.E.S., AND J. N. HALBERT.

[COMMUNICATED BY DR. R. F. SCHARFF, AS A REPORT FROM THE COMMITTEE APPOINTED BY THE ROYAL IRISH ACADEMY TO INVESTIGATE THE FLORA AND FAUNA OF IRELAND.]

[Read JUNE 24, 1901.]

INTRODUCTION.

No general list of the beetles of Ireland has hitherto been compiled, owing to lack of materials. The number of workers has always been small, and, as a result, information has accumulated but slowly. It is only within the last few years that it has become possible to produce a list indicating to some extent, at least, the coleopterous fauna of this country.

The present is, consequently, the first general list of Irish Coleoptera that has been published. It is not as complete as we could wish, but that defect is unavoidable in the present condition of things. It is quite impossible to gain a thorough knowledge of the insect fauna of any district without residing in it, and working it all the year round. There have been no resident workers at coleoptera in either the south or west of Ireland, or, indeed, in the midland districts, so that a large portion of the country is very imperfectly known. Incursions have been made, but there has been no continuous occupation. The present list must, therefore, be regarded as a starting-point for future workers, showing what has been done, and what remains to be accomplished.

The pioneer of the study of coleoptera in Ireland was Alex. Henry Haliday. The first record published by him is dated 1828, and was followed by many interesting notes on Irish beetles. In the year 1856 he contributed to "Thompson's Natural History of Ireland," a summary of the number of species representing the different families of Irish coleoptera then known to him, in which he enumerates 929 species, but without detail. A manuscript list of beetles of the Belfast district, compiled by him, was published in the Proceedings of the Belfast Naturalists' Field Club in 1885. It is much to be regretted that in this list no authors' names are given, as the omission has made

it very difficult in many cases to determine what species Haliday really referred to; indeed, in some instances we have considered it best to overlook the records altogether, and thus avoid introducing species which he never intended to authorise.

Along with Haliday in the study of Irish beetles there worked Alfred Furlong, A. B. Hogan, Robert Patterson, J. Tardy, E. P. Wright, and others. In the year 1838 Patterson published a book entitled "Letters on the Natural History of the Insects mentioned in Shakespeare's Plays," in which he gives many incidental records of Irish insects; and from a manuscript catalogue of his collection the Belfast Field Club published a short list of beetles from the north of Ireland.

During the years 1853 and 1854 Hogan published, in the *Zoologist*, a considerable list of the beetles occurring in the Dublin district, largely composed of Haliday's and Furlong's records. This list was re-edited and brought up to date by Professor R. M'Nab, and appeared in the British Association Guide to the County of Dublin in 1878. A few of these Dublin records are doubtful, owing to insufficient evidence of the occurrence of the species, or to confusion in synonymy: they will be found noted in their places in the present list.

From the time of Haliday and Hogan until the year 1887 the records are few in number. There were, it is true, descents made upon our coasts by a few English coleopterists, notably the late Dr. Power, Messrs. G. C. Champion, J. Ray Hardy, J. J. Walker, and others; but these were but flying visits, and though good work was done, it touched but a small area. In 1887 one of ourselves began to make an effort to rescue Irish coleoptera from the state of oblivion into which the subject had fallen. It was, however, with the inception of the *Irish Naturalist*, in 1892, that a real change took place. Greater attention was drawn to the study of the Natural History of our island, and the beetles came in for a share of the interest thus aroused. In 1893 the Royal Irish Academy appointed a Committee to investigate the Flora and Fauna of Ireland, and by their assistance many parts of the country, hitherto untouched, have been explored, and numerous and interesting additions made to our fauna. Of recent lists, apart from those for which we ourselves are responsible, the most important is that by Mr. C. W. Buckle of the coleoptera of the Foyle district. In it he has made many additions to our beetle fauna, and his list is further valuable as showing the species that inhabit the north-western extremity of the island. In the south Mr. H. K. Gore Cuthbert has done good work, but we could wish that his efforts were less sporadic, for they are invariably most successful. We may also refer to the list,

communicated by Mr. J. J. Walker to the *Irish Naturalist*, of captures of coleoptera in the counties of Cork, Donegal, and Down in the spring of 1895, in which are many useful records.

We have endeavoured to collate all the references published from the earliest to the most modern, and we have also availed ourselves of much unpublished information. In this connection we may mention that Dr. E. P. Wright has most kindly placed in our hands many valuable ms. notes which belonged to the late A. H. Haliday and Alfred Furlong. Amongst these may be mentioned—a ms. list of Irish coleoptera by Haliday; also Mr. Haliday's entomological diaries for the years 1836–1840 and 1849–1854; and a copy of "Stephens' Manual," with marginal notes on localities, made by Mr. Furlong. By these means much unpublished information has been fortunately preserved. We are indebted to Mrs. Osborne for a number of species collected by the late Dr. J. A. Osborne in the neighbourhood of Milford, Co. Donegal; and to Mr. C. W. Buckle for the trouble he has taken in examining and selecting specimens from this collection for the Dublin Museum.

It has been our earnest endeavour to make the list accurate, and to this end we have, where possible, examined all critical species, and obtained the opinion of experts thereon. For much kind help in this matter we have to thank Mr. G. C. Champion, F.Z.S.; Mr. J. Edwards, F.E.S.; Mons. A. Fauvel; Rev. Canon Fowler, F.L.S.; Dr. Edmund Reitter, and Dr. D. Sharp, F.E.S.

Where needful we have added notes on the habitat of the various species, but we have done so only in the case of those of less common occurrence, or whose habitat is obscure. It will be noticed that many records have been altered, or deleted: this was more or less inevitable where workers were isolated, and had little or no opportunity of comparing their specimens with reliable types, and consequently had to work to a great extent from descriptions alone.

Ireland cannot be easily divided according to natural features, as has been attempted, for instance, in the case of Scotland. Under these circumstances, and considering how imperfect our knowledge of our native coleoptera still is, we have thought it most convenient to adopt the provinces and counties into which the country is divided, in order to indicate the localities of the various species. It may be pointed out, however, that the four provinces of Ireland form of themselves fairly good natural divisions, indicating with considerable accuracy the range of northern, southern, eastern, and western species in Ireland.

In the case of species which are of general distribution we have merely given the provinces; where the records indicate a less general distribution of a common species we have added the counties, and where the species is rare, or local, we have specified the actual localities with references to captors and records.

In spite of the paucity of workers, and the well-known deficiencies of the Irish fauna, as compared with that of Great Britain, we are able to catalogue some 1630 species of beetles, or less than half the number already recorded from the British Isles. So similar is our coleopterous fauna to that of Great Britain and western Europe, that we do not know of any species peculiar to this country. The nearest approach to such an insect is the interesting form *Silpha subrotundata*, which, in our opinion, replaces the type (*S. atrata*) in Ireland. It has been recorded from the Isle of Man, doubtfully from England, and not at all from the Continent, so that we are justified in regarding it as a characteristic Irish insect. A somewhat similar case is that of the weevil *Rhopalomesites Tardyi* which is more generally abundant in the Irish area than in any other of its known localities. The species found in Ireland, and not elsewhere in the British Isles, are also few in number. So far as we are aware, they are the following:—*Dyschirius obscurus*, *Bembidium argenteolum*,¹ *Stenus argentellus*, *Xantholinus cribripennis*, and *Otiorrhynchus auropunctatus*, besides a few varieties of other species. It is a noteworthy fact, that the three first-mentioned species were discovered on the shores of Lough Neagh, a locality which has produced many interesting plants and animals, rare, or unknown in other parts of the country.

A study of the Irish beetle fauna shows that it is made up of various groups of species which may be recognised by means of their European range. Some of these are of little interest as regards distribution, while others are just the opposite. Such species as *Carabus granulatus* and *Dytiscus marginalis*, being common throughout the British Isles and the Palæarctic region, possess little interest from a distributional standpoint. A large proportion, however, of our native species are more or less local, and may be grouped according to the areas which they inhabit in the Palæarctic region at the present day. So far as Ireland is concerned, at least three main groups may be pointed out.

The first of these groups consists of species which range over central Europe and the Mediterranean region, but are rare or wanting

¹ *Bembidium argenteolum*, *Xantholinus cribripennis*, and *Stenus argentellus* are recorded as British species for the first time in the following list.

in Scandinavia and northern Europe. In Great Britain the more typical of these species are confined to the southern counties of England, a minority ranging north into Scotland. The following Irish species may be quoted as examples of this group:—

Calosoma inquisitor, **Panagæus cruz-major*,¹ *Pelobius tardus*, *Haliphys variegatus*, *Calambus confluent*, *Bryaxis Helferi*, **Onthophagus fracticornis*, *Aphodius constans*, *Geotrupes typhæus*, **Cetonia aurata*, *Psilothrix nobilis*, **Aromia moschata*, **Strangalia aurulenta*, **Donacia braccata*, *Hæmonia appendiculata*, *Timarcha tenebricosa*, **Chrysomela varians*, *Choragus Sheppardi*, *Sermyla halensis*, *Sitones Waterhousei* and *Liparis coronatus*.

We find these species very unevenly distributed in Ireland; some occur only in the east, between the counties of Waterford and Antrim, while very many others have established their headquarters in the south and west. The Musk Beetle (*Aromia moschata*) for instance is rather common in the Kerry woodlands, and has also been found in the county Galway, and in the north, but we have no record of its occurrence in the province of Leinster. The Rose Beetle (*Cetonia aurata*) furnishes another interesting example; it is most common on the south-west coast from Waterford to Galway (especially on Inishmore in Galway Bay, where it abounds), but it is very seldom met with in our eastern counties. No doubt this western tendency is in some instances due to the greater prevalence of woods, or boglands, or to the occurrence of local food-plants; while the destruction of forests in many districts must also have been instrumental in restricting the range of certain wood-feeding insects. Still these considerations do not account for the absence from the eastern counties of Ireland, of such insects as *Panagæus*, *Onthophagus*, and certain species of *Donacia*. Indeed the fact that species common in Europe should be found in Ireland, only in the south and west, furnishes one of the most interesting distributional features of our beetle fauna.²

A second group is composed of species that are of northern origin, a good many of which inhabit mountain districts. The following may be cited as examples amongst the Irish beetles:—*Carabus clathratus*, *Carabus glabratus*, *Nebria Gyllenhali*, *Pelophila borealis*, *Blethisa multipunctata*, *Bembidium argenteolum*, *Calambus quinque-lineatus*, *Agabus arcticus*, *Dytiscus lapponicus*, *Acidota crenata*, *Pselaphus dresdensis*, *Silpha dispar*, *Arpedium brachypterum*, *Aphodius*

¹ The species marked with an asterisk (*) range west in Ireland.

² Students of distribution will find an interesting paper bearing on this subject by Mr. G. H. Carpenter, B.Sc., in *Nat. Science*, xi., pp. 375-386.



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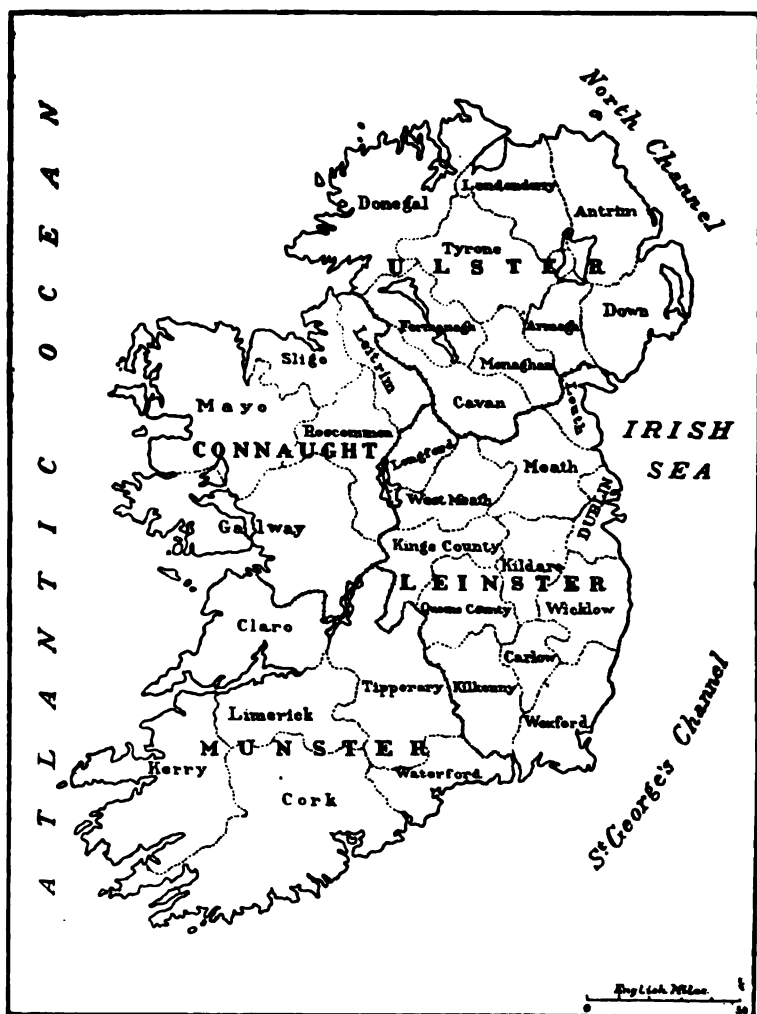
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OUTLINE MAP SHOWING THE PROVINCE AND COUNTY DIVISIONS
OF IRELAND.

A LIST OF THE BEETLES OF IRELAND.

CICINDELIDÆ.

Cicindela campestris, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Armagh, Mayo, Roscommon, Galway, Westmeath, Dublin, King's County, Queen's County, Wicklow, Carlow, Wexford, Clare, Limerick, Waterford, Cork, Kerry.

Widely distributed, though somewhat local in its occurrence, occasionally found in very numerous colonies on the coast, and on the drier parts of the midland bogs. It has also been found on the islands of Rathlin, Achill, Valentia, and on the Blaskets.

CARABIDÆ.

Cychrus rostratus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Mayo, Dublin, Wicklow, Queen's County, Wexford, Cork, Kerry.

Somewhat locally distributed throughout the country on high ground. On Achill Island it occurs from the summit of Slievemore, down to sea level.

Carabus catenulatus, Scop.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Fermanagh, Cavan, Sligo, Mayo, Galway, Dublin, Wicklow, Wexford, Cork, Kerry.

Not common, occurring chiefly in mountain districts, ascends to over 3000 feet on the Reeks.

C. nemoralis, Müll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. glabratus, Payk.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Coxtown, '00 J. 4; Milford, coll. Osb.).—Antrim and Down (near Belfast, '85 H.; Slieve Donard, '85 Pn.).—Sligo (Ben

Bulben, '01 D.N.F.C.).—Dublin (Glenasmole, '95 D.N.F.C.; Tibbradden, '00 Ht. 3).—Wicklow (Lough Bray, '53 Hn.; Sugar Loaf, H. MS.; Lough Nahanaghan, '92 C. 1; Lugnaquilla, H. coll.).—Waterford ("Monovollough mountains,"¹ '32 St.).—Cork (mountains between Adrigole and Glengariff, '94 J. Ht. Cr.).—Kerry (Conor Hill, '55 Hn. 2; Parknasilla and Waterville, '01 Ch., coll. Yr.; "not uncommon at the entrance to the Horses' Glen at the foot of Mangerton." '84 Rd.; "Mucruss, Turk and Carrantual," H. MS.).

Quite a mountain species, and very local. It ranges over northern and central Europe, Scotland, and the north of England and Wales.

C. violaceus, L.

ULSTER. MUNSTER.

Donegal (Portsalon, '94 J. 2, coll. Sn.; Teelin Bay, '94 J. 2, coll. Wr.).—Antrim ('91 F. 1; Rathlin, '97 Hr.).—Cork (H. MS.).

Very rare. The record, Armagh ('91 F. 1), is to be deleted.

C. clathratus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Milford, coll. Osb.; Teelin Bay, '80 Wr.; Ardara, '92 J. 3; Bundoran).—Derry (mountains near Dungiven, '94 J. 2, coll. Bw.; Lough Fea, coll. Orr.).—Antrim (Rathlin, '97 Hr.; Clogh, '96 J. 3).—Down (near Belfast, '85 H.; Birkie Bog, '38 Pn.).—Fermanagh (Belleisle, '98 Pr.).—Mayo (Westport, '80 Wr.; Bofin, coll. Fn.; Achill, '96 Ht. 2; Inishturk, Bn.).—Sligo (Manorhamilton, Sp.).—Galway (Leenane and Roundstone, Ht.; Carn Seefin, '95 Ht. 6; Dinish Island, '80 Wr.).—Dublin ("near the Irish metropolis," '32 St.).—Wicklow (Enniskerry, '53 Hn.; Great Sugar Loaf, '96 C. 1; Kilmacanogue, C.).—Limerick (Parteen Bog, Fg. coll.).—Waterford (Comeragh mountains, Nl.).—Cork (Slieve Mish Kish, '94 J. Ht. Cr.; Glengariff road between Kenmare and Glengariff, '98 Ht. 4).—Kerry (between Killorglin and Glen Carragh, and on the "Gallerus Sands," '55 Hn. 2).

Appears to affect turf bogs either close to the sea or at some elevation. Mr. Walker says:—"At Teelin Bay I took more than forty examples in less than an hour's work on the evening of April 28th. They occurred under loose stones on the tops of turf walls and in a boggy place of a very limited extent." At Leenane specimens were

¹ This locality—marked Moana vullagh on old maps—lies between Mount Kennedy and the Comeragh Mountains.

taken in flood refuse from the Erriff River in the beginning of April. There is only one English record, Norfolk, where it is said to have been taken in 1809. Rather common in Scotland, where it ranges from the Clyde to Sutherland, and Hebrides. Widely distributed over northern and central Europe, occurring also in Siberia.

***C. nitens*, L.**

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Derry (mountains near Dungiven, '94 J. 2, coll. Bw.).—Antrim (Glenarm, common under moss, '78 Br.).—Down (near Belfast, 85 H.; Birkie Bog,¹ '38 Pn.).—Kilkenny (Fg. MS.).

Very local. Mr. C. W. Buckle found this beautiful insect commonly on the Donegal mountains in May and June. Occurs in Scandinavia and northern Europe, ranging to Austria and France (Calais). In Great Britain it is found locally on heaths from the south of England (New Forest), as far north as the Forth and Clyde districts.

[*C. auratus*, L.—“This insect was taken some years since at Lough Bray, by the Rev. E. Tardy and the late T. Coulter, Esq.; but I have not heard of any recent instance of its capture” ('53 Hn.). “Bridle road between the lakes—L. Bray. E. Tardy litt.!” (H. MS.). There is no evidence that Haliday saw these reputed specimens of *C. auratus*; and as the nature of the locality precludes the possibility of introduction, it seems probable that the record is erroneous. Possibly the specimens belonged to the preceding species, (*C. nitens*). In recent British lists it is included amongst the introduced species.]

***C. granulatus*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common; varies considerably in colour from dull bronze to brilliant green.

***C. cancellatus*, Illig.**

MUNSTER.

Cork (East Poulador, near Rosscarbery, '95 C. 1 and 2).

One specimen, a female, taken by Mr. H. G. Cuthbert, on the Cork coast, towards the end of August, 1895. This rare species has

¹ This bog has now disappeared, but as nearly as can be ascertained it was situated in the Barony of Lower Castlereagh between Moneyreagh and Comber, where there is a place called Birk Hill.

been practically reinstated into the British list on the strength of Mr. Cuthbert's discovery, as there had been previously only one or two rather doubtful English records. It would seem to be rather a common species over northern and central Europe, including France. Siberia.

C. monilis, F.

ULSTER. LEINSTER.

Fermanagh (Tempo, '97 L. 1).—Dublin (taken by the late J. Tardy, Esq., '53 Hn.).—Wicklow ("Dargle A. F.," H. MS.).—Ireland (H. coll.).

Rare. Mr. Langham's is the only recent capture of this insect in Ireland. The records, Armagh ('91 F. 1), and Donard ('85 J.), are to be deleted.

C. arvensis, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Milford, coll. Osb.; Rathmullan, '91 F. 1; Ardara, '00 J. 2).—Derry (Lough Fea, Orr.).—Antrim and Down (Rathlin, '97 Hr.; Ballintoy, '94 J. 2; Hills near Belfast, '54 Ds.; '85 H.; Slieve Donard, Sp.).—Armagh (Newtown Hamilton, on high ground, '00 J. 2).—Galway (Clonbrock, '96 Ht. 2).—Dublin (mountains, '92 C. 1).—Wicklow (Douce, '94 J. 2, coll. C.).—Clare (Lough Derg, near Killaloe, '71 S.).

Local and not common. Occurs among heather, and in moss.

Calosoma inquisitor, L.

LEINSTER.

Wicklow ("Mr. Tardy has seen them flying amongst oak-trees at Powerscourt," '39 Curtis; "Powerscourt, Mr. Furlong," '56 Hn.).

Two of the Powerscourt specimens are in the Dublin Museum collection. This species is widely distributed over Europe, Siberia, and the Mediterranean region (Ganglbauer)

[*C. sycophanta*, L.—There is an Irish-taken specimen of this beautiful insect in the Dublin Museum, which had been formerly in the Trinity College collection. Stephens remarks ('32 St.): "has been occasionally taken in Ireland," and Dawson also mentions it from Ireland ('54 Ds.). "One example was recorded from the Irish coast in 1815" ('91 F. 1); "J. Tardy had (it) from Belfast" (H. MS.). These Irish examples may have been introduced, as the

species is certainly not indigenous in Great Britain. *C. sycophanta* is a common continental insect inhabiting oak-forests, where it follows and devours the Processionary caterpillar.]

Notiophilus biguttatus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

N. substriatus, Wat.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Tyrone, Down, Armagh, Cavan, Mayo, Galway, Louth, Westmeath, Dublin, Cork.

Not so common as the preceding species.

[*N. quadripunctatus*, Dej.—Doubtful. It is included by Haliday in his Belfast list, but omitted from his MS. list of Irish beetles. The record, Armagh ('92 J. 4), is to be deleted. Varieties of *N. biguttatus*, F., with additional punctures, have been mistaken for the present species.]

N. aquaticus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

N. palustris, Duft.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Quite as widespread as the preceding, and has been found with it in such remote localities as Rathlin and Achill.

[*N. rufipes*, Curt.—The record, Rathlin ('97 Hr.), is to be deleted.]

Leistus spinibarbis, F.

ULSTER.

Antrim (Rathlin, '97 Hr.; Kinbane Head, Cs.).

Rare. It has been recorded from "near Belfast" ('91 F. 1), but as it is not mentioned in Haliday's list, this record may be due to some confusion of names.

L. montanus, Steph.

CONNAUGHT. MUNSTER.

Mayo (common on Slievemore, Achill, '98 Ht. 2; Croagh Patrick, '54 Ds.; H. and Wr.).—Galway (Ben Lettery, '95 Ht. 6).—Kerry

(Mangerton and Carrantuohill, '54 Ds., coll. H.; Caher between 2700 feet and summit, '99 Sch. and Cr.).

An alpine species occurring on mountain summits, where it is sometimes common under stones and among heather. The record, Lugnaquilla ('96 Ht. 1), is to be deleted, the Haliday specimen there referred to, being from Carrantuohill. Very local in the highlands of Scotland, northern England, and the western Alps (Pyrenees, Switzerland, Tyrol).

***L. fulvibarbis*, Dej.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. Occurs on Rathlin, Achill, and Valentia.

***L. ferrugineus*, L.**

ULSTER. LEINSTER. MUNSTER.

Antrim (Rathlin, '97 Hr.; Belvoir Park, Sn.).—Down (near Belfast, '85 H.).—Dublin ("very local," '53 Hn.).—Kerry (Conor Hill and Mangerton, '55 Hn. 2).

Rare. The old records stand as *L. spinilabris*, possibly one or two of these were intended for the following species. The only Irish specimen that we have seen is from Belvoir Park, Belfast.

***L. rufescens*, F.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Louth, Dublin, Wicklow, Wexford, Limerick.

***Nebria complanata*, L.**

LEINSTER.

Wicklow ("a single specimen was found (half dead) on the Arklow sands by Mr. Furlong," '54 Ds.; "In the middle of July many specimens were obtained, lurking under the luxuriant fronds of *Asplenium marinum*, at the foot of the rocks on the coast, about three miles south of the (Arklow) harbour," '57 H., coll. Wt.).—Wexford (Courtown; "This species was first taken at Courtown by Mr. W. F. de V. Kane. It occurs in some numbers on rocky ground at Riverchapel, just above high-water mark," '92 C. 6; "Rosslare, July, plentiful," Fg. MS.).

Locally abundant on the south-east coast, between the counties of

Wicklow and Waterford. Elsewhere it has been recorded from the coasts of the Bristol Channel, France, and the Mediterranean region. This is an excellent example of a species which has spread along our east coast.

***N. brevicollis*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***N. Gyllenhali*, Sch.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Mayo (Slievemore and Croagh Patrick), Galway, Dublin, Wicklow, Cork, Kerry.

A northern and alpine insect, usually found on high ground, but occurs commonly at Armagh and other lowland localities in Ireland. It is particularly abundant on Slievemore (Achill), Lugnaquilla, the Dingle mountains, and the Reeks. Elsewhere, this insect occurs over northern Britain, in Greenland, and, according to Ganglbauer, throughout the north Palearctic region, and the mountain districts of central Europe.

***Pelophila borealis*, Payk.**

ULSTER. CONNAUGHT. MUNSTER.

Donegal (Milford, coll. Osb.; Coolmore, '95 J. 1; River Erne, near Ballyshannon, '94 J. Ht. Cr.).—Derry (Toome, coll. Wl.).—Antrim and Down ("sandy shore of Lough Neagh," '89 Curtis; Shane's Castle, '88 Pn.; Ram's Island, L. Neagh, Orr.; Clogh, '96 J. 3.).—Armagh (Lowry's Lough, '87 J. 1; Clay Lake, '87 J. 2; Lough Neagh at Maghery and Derryadd, '88 J. 2; Mullinure, '92 J. 4; Camlough, '97 J. 4).—Fermanagh (Tempo, '97 L. 1).—Mayo (Island Lough near Ballyhaunis, Sp.).—Sligo (Lough Gill, J.; Markree Castle, K.).—Roscommon (Lough Ree, '98 Ht. 1).—Galway (Lough Corrib shore, near Oughterard, '95 Ht. 6).—Kerry (Killarney, '47 W. 1; Muckcross, Fg. MS.).

Common where it occurs in the north, west, and south-west of Ireland, occurring on the shores of lakes and rivers, under stones, where there is mud or marly clay. The perfect beetle is very active, runs quickly when disturbed, and flies in the bright sunshine. It is most abundant in the months of June, July, and August, but specimens have been taken as early as April and as late as October. For a detailed account of the larva of this species see ('98 J. and Cr.). Dawson remarks that "the Irish examples are larger and more metallic than those found in Scotland." This interesting species has

been recorded from northern Siberia, N. Russia, and Scandinavia, while in Great Britain it is only definitely known to occur in the Orkneys.

***Blethisa multipunctata*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Milford, coll. Osb.; Coolmore, '94 J. Ht. Cr.).—Derry (Lough Fea, Orr.).—Antrim (Rathlin, '97 Hr.; Clogh, 96 J. 3).—Down (near Belfast, '85 H.; Holywood, H. MS.).—Armagh (Lowry's Lough, '87 J. 1; Camlough, '97 J. 4).—Fermanagh (Belleisle, '97 Pr.).—Monaghan (Drumreask, K.).—Sligo (Templehouse Lake, near Ballymote, Jn.).—Roscommon (Lough Ree, '98 Ht. 1).—Galway (Clonbrock, D.).—Clare (Killaloe, '71 S.).—Waterford (Ballyscanlan Lake, Ht.).—Kerry (Killarney, Fg. MS.; Kenmare, '98 Ht. 4; Valentia, Ht., coll. Dp.).

Rare; frequents very marshy places, and unless the season is a dry one, it is usually difficult to obtain. It is a northern species occurring over northern and central Europe, Siberia, and in North America.

***Elaphrus riparius*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Monaghan, Sligo, Mayo, Westmeath, Dublin, Wicklow, Clare, Limerick, Kerry.

Widely distributed, but less common than *E. cupreus*, Duft.

***E. cupreus*, Duft.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in suitable localities from Rathlin to Kerry.

***E. uliginosus*, F.**

MUNSTER.

Cork (Glengariff, '01 Ch., coll. Yr.).

A single specimen taken by Col. J. W. Yerbury, August, 1901. Distribution—northern and central Europe, Siberia.

***Loricera pilicornis*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Clivina fossor*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. collaris, Herbst.

ULSTER.

Donegal (Portsalon, '94 J. 2, coll. Sn.).—Antrim (Rathlin, '97 Hr.; Ballycastle, T.).—"Ireland, Tardy Coll." (Fg. MS.).

Very rare.

Dyschirius thoracicus, Rossi.

ULSTER. LEINSTER.

Derry (Foyle dist., '00 B.).—Lough Neagh ('47 W. 2, coll. H.).—Louth (Estuary of the Boyne, '94 J. 2, coll. C.).—Dublin (Portmarnock and Portrane, '53 Hn.; Rush, Sp.).

Local, but probably more widespread than the above localities indicate. The records, Armagh ('87 J. 1; '88 J. 2), are to be deleted.

D. obscurus, Gyll.

ULSTER.

Armagh (Lough Neagh shore at Maghery, '95 J. 2, 3).—"Mr. Haliday informs me that he has captured it on the sandy shores of Lough Neagh" ('54 Ds.).

Extremely local. After many fruitless searches, one of us succeeded in rediscovering this rare species at L. Neagh, where it was found in company with *Bledius subterraneus*, on which it evidently preys. Its rediscovery at L. Neagh is most interesting, as it is the only place in the British Islands in which it is known to occur, though Mr. G. C. Champion detected specimens in an old collection which was supposed to have been made in Scotland. The European range of this species is curiously suggestive of a "relic" fauna, as it has been recorded from the coast of the North Sea, also the Baltic, Black, and Caspian Seas (Ganglbauer), and Picardy (Acloque). The fresh-water shrimp *Mysis relicta* is regarded by many as a relic; and it also occurs in Lough Neagh, Scandinavia, Russia, and North America, while allied forms of *Mysis* have been described from the Caspian Sea.

D. impunctipennis, Daws.

ULSTER. CONNAUGHT.

Donegal (Buncrana, '95 Wr.; Coolmore, '95 J. 1).—Antrim (Rathlin '97 Hr.).—Sligo (Enniscrone and Rosses Point, J.).

Mr. J. J. Walker records this species as locally abundant at Buncrana; it occurred in company with *Bledius arenarius* at Coolmore.

D. politus, Dej.

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Ardara, '92 J. 3; Coolmore, '94 J. Ht. Cr.).—Derry (Magilligan sands, '00 B.).—Antrim (Cranmore, '85 Pn.; Portstewart, '94 J. 2).—Down (near Belfast, '85 H.).—Sligo (Enniscrone, J.).—Louth (Clogherhead, '92 C. 1).—Dublin (Strand at Killiney, '94 J. 2, coll. C.)

Local; but common where it occurs.

D. salinus, Schaum.

ULSTER. LEINSTER. MUNSTER.

Donegal (Portsalon, '94 J. 2, coll. Sn.).—Down (Holywood shore, '54 Ds., coll. H.; north shore of river between Comber and Strangford Lough, B.).—Dublin (Portrane, '53 Hn.; Sutton, '95 Ht. 3; Portmarnock, '00 Ht. 3).—Wicklow (shore, '94 J. 2, coll. C.; Newcastle, '92 C. 1).—Waterford (Tramore, Ht.).

D. senes, Dej.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Derry (Foyle dist., '00 B.).—Down (Holywood, recorded as *D. aeratus*, '28 H., see also '54 Ds.).—Galway (banks of the Corrib, near Galway, '95 Ht. 6).—Dublin (Portmarnock, '00 Ht. 3).—Kerry (Ballybunion, '98 C.).

Local.

D. globosus, Herbt.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

Brosicus cephalotes, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common all round the coast, under stones and seaweed.

Panagæus crux-major, L.

MUNSTER.

Clare (Finlough, '96 and '97, N.).

Discovered by Mr. F. Neale, under stones, on the lake shore in May, 1895. Mr. Neale found it to be extremely local, but by searching for it at the exact time and place—in subsequent seasons—he succeeded in capturing a number of specimens. No doubt it will

eventually be found at other localities in the south-west, but it must be very rare, as it is not likely that such a conspicuous insect could have escaped observation in the eastern parts of Ireland. In Great Britain it ranges from Kent to Lincolnshire; and Ganglbauer records it from Europe, Asia Minor, Caucasus, and southern Siberia.

***Badister bipustulatus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***B. unipustulatus*, Bon.**

MUNSTER.

Waterford (coll. Nl.).

Taken by Mr. A. Neale, April, 1896.

***B. sodalis*, Duft.**

ULSTER. CONNAUGHT.

Antrim (Colin Glen, B.).—Down (near Belfast, '85 H.).—Roscommon (banks of the R. Suck, near Mount Talbot, '98 Ht. 1).—Galway (Wr.).

Rare.

***Chlœnius vestitus*, Payk.**

ULSTER. LEINSTER. MUNSTER.

Down (Mourne Mountains, J., coll. Tn.).—Armagh (Coney Island, L. Neagh, '87 J. 2).—Westmeath (Lough Ree, '00, Ht. 1).—Dublin (Dodder banks, '53 Hn.; Ht.; mountain streams, '92 Bn. and C.).—Queen's County (Abbeyleix, Bn.).—Carlow (Borris, '70 Ft.).—S. Clare and Limerick (lake shores, Ht.).

Locally common.

***C. nigricornis*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (south), Antrim (Rathlin to Belfast), Down, Armagh, Fermanagh, Galway, Dublin (south), Clare (south), Limerick, Waterford, Cork, Kerry.

Common on river banks and lake shores.

***C. holosericeus*, F.**

LEINSTER. MUNSTER.

Kildare (near Athy, '54 Ds., coll. H.).—Clare (shore of Lough Derg, near Killaloe, '71 S.).—Kerry (marsh by the Sheen River, near Kenmare, '98 Ht. 4).

Extremely local. Mr. S. Stevens records the capture of six examples on the 29th of May in a marshy place on the banks of Lough Derg, about six miles from Killaloe. Several specimens were taken near Kenmare in the month of July. Abroad this species has a wide range, being spread over northern and central Europe, the Mediterranean region, and Siberia; but it is very rare in England, occurring only in a few localities in the east, as far north as Yorkshire.

***Stenolophus vespertinus*, Panz.**

MUNSTER.

Clare (Finlough, Ht.).—Limerick (Parteen bog, Fg. MS.).—Waterford (Ballyscanlon Lake, Ht.).—Kerry (Killarney, '71 S.).

Local in the south-west, at roots of rushes in boggy places and on lake shores.

[*S. elegans*, Dej.—The record, Lowry's Lough ('92 J. 2, addenda), is to be referred to *A. dorsalis*, F.]

***Acupalpus dorsalis*, F.**

ULSTER. MUNSTER.

Armagh (Lowry's Lough, J.).—Waterford (Ballyscanlon Lake, Ht.).—Cork (Queenstown, '95 Wr.).

***A. exiguus*, Dej.**

LEINSTER. MUNSTER.

Louth (Clogher Head, '92 C. 1).—Carlow (Borris, '95 Ht. 8).—Waterford (Ballyscanlon Lake, Ht.).—Cork (Queenstown, '95 Wr.).—Kerry (Valentia, '98 Ht. 3).

The Irish specimens that we have seen are referable to the var. *luridus*, Dej.

***Bradycellus placidus*, Gyll.**

ULSTER.

Antrim (Ballycastle, '00 J. 2).—Armagh (Loughgilly, '00 J. 2). Abundant at Loughgilly in moss near the lake.

***B. cognatus*, Gyll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim and Down (Rathlin, '97 Hr.; Cave Hill, B.; hills near Belfast, '54 Ds., coll. H.).—Armagh (Newtown Hamilton, '91 J. 2).—

Mayo (Achill, Slievemore, '98 Ht. 2).—Wicklow (Douce, '97 Bk.).—Kerry (Ballybunion, '98 C.; Magillicuddy's Reeks, '99 Sch. and Cr.).
High ground; frequent on mountain summits.

B. distinctus, Dej.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Galway, Louth, Westmeath, Dublin, Wicklow, Wexford, Cork, Kerry.

Not common.

B. verbasci, Duft.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

B. harpalinus, Dej.

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Dublin, Wicklow, Kerry.

B. collaris, Payk.

ULSTER. LEINSTER.

Donegal (Roosky Mountain, near Buncrana, '95 Wr.).—Antrim (Cave Hill, B.).—Dublin ('56 Hn. 1).

Rare.

B. similis, Dej.

ULSTER. CONNAUGHT. LEINSTER.

Donegal, Derry, Antrim, Down, Armagh, Galway, Louth, Dublin.
Common where it occurs in moss and under stones.

Harpalus punctatulus, Duft.

LEINSTER.

Dublin (near Dublin, '78 P.).

[*H. ruficola*, Sturm.—The records, Greenore ('88 J. 1, and '94 J. Ht. Cr.) should have referred to *H. rufibarbis*, F. var.].

H. puncticollis, Payk.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Mayo (Westport, Wr.).—Galway (Woodford, Ht.).—Louth (Clogher Head, '92 C. 1).—Dublin (Portmarnock, '53 Hn.; Killiney, Bk.; Greystones, Sp.).—Wexford (Courtown, '92 C. 1 and 6).—Kerry (Ballybunion, Ht. coll. C.).

Probably common. Has been confused with the following species.

H. rufibarbis, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Down, Armagh, Fermanagh, Galway, Louth, Westmeath, Dublin, Carlow, Cork.

Common.

H. ruficornis, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*H. griseus*, Pans.—The records ('91 F. 1), and S. Louth ('94 J. 2), are to be deleted.]

H. senecus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, especially on the coast.

[*H. consentaneus*, Dej.—The records, Marino ('92 Pt. and Dn.) and Loughgilly (94 J. 2), are to be deleted.]

H. rubripes, Duft.

ULSTER. MUNSTER.

Down (near Belfast, '85 H.).—Cork (Fg. MS.).—Kerry (Kenmare or Caragh Lake, '01 Ch., coll. Yr.).

The Belfast record is doubtful, as Haliday queries the species in his MS. Irish list. A variety with dark femora occurred in the Kerry locality.

[*H. caspius*, Stev.—There is a specimen of this species in the Dublin Museum collection marked as Irish, but in the absence of any record of its occurrence it cannot be included with certainty.]

H. latus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. Occurs on Rathlin, Achill, and Valentia.

H. quadripunctatus, Dej.

LEINSTER.

Wicklow (Sugar Loaf mountain, '78 Ch.).

A single specimen taken on the summit in June. *H. iv-punctatus* is chiefly a mountain insect occurring locally in the Highlands of Scotland, N. England, and over northern and central Europe.

H. melancholicus, Dej.

MUNSTER.

Cork ("Glengarriffe, in Ireland, in August and September," '58 Ds.).

H. tardus, Panz.

ULSTER. LEINSTER. MUNSTER.

Derry (Foyle dist., '00 B.).—Down (near Belfast, '85 H.; Newcastle, '00 J. 4; Ch.).—Louth (south, 94, J. 2, coll. C.; Greenore, '88 J. 1).—Meath (Laytown, '94 D.N.F.C.).—Dublin (south, '94 J. 2, coll. C.; Portmarnock, '53 Hn.).—Wexford (Ross-lare sandhills, Ht.).—Waterford (Tramore, Ht.).

Local on the coast.

H. anxius, Duft.

LEINSTER.

Meath (Laytown, '94 D.N.F.C.).—Dublin (Portmarnock, Fg. MS.).

Taken on the Laytown sandhills by Mr. R. Standen.

H. ignavus, Duft.

LEINSTER.

Dublin (Portmarnock, '53 Hn.).

H. honestus of this reference.

H. neglectus, Dej.

ULSTER.

Antrim (Rathlin Island, '97 Hr.).

Dichirotrichus obsoletus, Dej.

MUNSTER.

Cork (Queenstown, Wr.).

D. pubescens, Payk.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Sligo, Mayo, Galway, Louth, Meath, Dublin, Wexford, Waterford, Cork, Kerry.

Common on the coast.

Anisodactylus binotatus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Armagh (Lowry's Lough, '88 J. 2).—Roscommon (Mount Talbot, '98 Ht. 1).—Galway (Kilkieran Bay, Wr.).—Louth (Bellurgan, '88 J. 1).—Cork (Fg. MS.; Glengariff, '94 J. 2).—Kerry (Rossbehy and Killarney, '71 St.).

Rare. The specimens from Armagh and Roscommon are referable to the variety *spurcaticornis*, Dej.

[*Zabrus gibbus*, F.—Very doubtful as an Irish species, it is recorded in an anonymous note ('36 "Jonicus") as having been found at Fermoy, but confirmation of the record is needed. In Stephens' "Manual" ('39 St.) it is recorded from Ireland, probably on the strength of the earlier reference.]

Stomis pumicatus, Panz.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Fermanagh, Roscommon, Dublin, Carlow, Limerick, Kerry.

Frequent.

[*Platyderus ruficollis*, Marsh.—The record, Portballintrae ('87 J. 1), is to be deleted.]

Pterostichus cupreus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

P. versicolor, Sturm.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Less common than the preceding species.

P. lepidus, F.

ULSTER. MUNSTER.

Donegal (Portsalon, Hr., coll. Sn.).—Waterford ('78 P.).

P. madidus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common—occurring on Rathlin, Achill, and Valentia.

[*P. athiops*, Panz.—The record, Rathlin ('97 Hr.), is to be referred to the preceding species.]

***P. oblongo-punctatus*, F.**

ULSTER. MUNSTER.

Antrim (Ballycastle, '00 J. 2; Jn.; Whitepark and Murlough Bays, Cs.).—Cork (Fg. MS.).

Very local. Dr. G. W. Chaster obtained it commonly under stones in a wood at Murlough Bay. Distribution—northern and central Europe, and Siberia.

***P. vitreus*, Dej.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Foyle dist., '00 B.; Ardara, '93 J. 1; Buncrana, '95 Wr.; Rathmullan, Wr.).—Antrim (Cave Hill, B.; Rathlin, '97 Hr.).—Down (near Belfast, '85 H.).—Sligo (Keashcorran, Ht.).—Mayo (Croagh Patrick, Sp.).—Dublin ("near Dublin, by the Rev. J. Bulwer," '32 St.; Lough Bray, H. MS.; mountains, '92 C. 1).—Wicklow ("Military Road," '53 Hn.; Douce, '97 Bk.; Lugnaquilla, Sp.).

On high ground, usually among bogs; "the Irish specimens are more brassy, and were called by Stephens *Omasus Bulweri*" ('91 F. 1).

Distribution—northern Europe, Siberia, and in N. America.

***P. aterrimus*, Payk.**

MUNSTER.

Cork ("near Cork—whence I have received several specimens from Mr. Drummond," '32 St.; "Mr. Clear has also taken it in the neighbourhood of Cork," '54 Ds.).

Very rare. Curtis mentions that the Irish specimens sent to Mr. Stephens "were said to have been taken in an ant's nest" ('39 Curtis), but Stephens does not mention this fact in his record. There are Irish-taken examples in the Haliday collection which may be from the Cork locality. According to Ganglbauer, the species is distributed over northern and central Europe, and the west Mediterranean region. Siberia (Heyden). Canon Fowler records it from a few localities only in the Fen district.

***P. niger*, Schall.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. vulgaris*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. anthracinus*, Ill.**

ULSTER. CONNAUGHT. MUNSTER.

Down (near Belfast, '85 H.).—Cavan (Lough Oughter, '94 J. Ht. Cr.).—Galway (L. Derg, near Woodford, Ht.).—Limerick (Thomond Br., Fg. coll.).—Cork (Glengariff, '01 Ch., coll. Yr.).

Local, on lake shores.

***P. nigrita*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. gracilis*, Dej.**

ULSTER. MUNSTER.

Down (near Belfast, '85 H.).—Cavan (Lough Oughter shore, '94 J. Ht. Cr.).—Waterford (Ballyscanlon Lough, Ht.).

The records, Ardara ('93 J. 1), Armagh ('92 J. 3), Loughgilly ('94 J. 2), Carlingford ('94 J. 2), S. Louth ('94 J. 2), Stillorgan ('92 C. 1), are to be deleted.

***P. minor*, Gyll.**

ULSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (shores of L. Neagh near Antrim, '01 Be.; Belfast, B.; Portrush, J.).—Down (near Belfast, '85 H.; Holywood, '92 Pt.).—Armagh ('92 J. 2; Lough Neagh, &c., J.).—Clare (Cratloe Hill, Ht.).—Cork (Rosscarbery, '95 C. 1).

Not common; probably overlooked in intermediate localities.

***P. strenuus*, Panz.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. diligens*, Sturm.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Fermanagh, Armagh, Monaghan, Cavan, Sligo, Galway, Westmeath, Dublin, Cork, Kerry.

Widely distributed, but much less common than the preceding species.

***P. pioimanus*, Duft.**

LEINSTER.

Dublin (taken by the late Mr. Tardy, '53 Hn.; '54 Ds.).

There are Irish specimens of this species in the Dublin Museum and Trinity College collections.

***P. vernalis*, Gyll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.
Common.

***P. striola*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.
Common.

***Amara fulva*, Dej.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Derry, Antrim, Down, Mayo, Galway, Louth, Dublin, Wexford,
Waterford, Kerry.

Locally common on the coast; occurs on Achill and the Blaskets.

***A. apricaria*, Sturm.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Rathmullan, Wr.).—Antrim (Cranmore, '85 Pn.).—Down (near Belfast, '85 H.; Castlewellan, '85 Pn.).—Armagh (Moyntuagh Bogs, '85 Pn.).—Louth (Greenore, '88 J. 1).—Mayo (Westport, Wr.).—Clare (Lahinch, Gr.).—Dublin (local, '53 Hn., Portmarnock, Skerries, &c.).—Wicklow (Bray, Ch.).—Cork (Rosscarbery, '95 C. 1).—Kerry (Ballybunion, '98 C.; Kenmare, '98 Ht. 4.).

Frequent.

***A. consularis*, Duft.**

ULSTER. LEINSTER.

Derry (Foyle dist., Ht., coll. B.).—Antrim and Down (Rathlin, '97 Hr.; near Belfast, '85 H.; Groomsport, '00 J. 4).—Louth (Greenore, '88 J. 1).—Dublin (Portmarnock, '78 M.).—Wexford (Courtown, '92 C. 6).

***A. spinipes*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Sligo, Mayo, Galway, Louth, Dublin, Wicklow, Queen's County, Clare, Waterford, Cork, Kerry.

Frequent; occurs on Rathlin, Achill, and Lambay.

***A. convexiuscula*, Marsh.**

MUNSTER.

Cork (salt marshes near Cork, '54 Ds.; Fg. and H. MSS.).—Kerry (Castlemaine, Fg. MS.; see also '55 Hn. 2).

Very rare ; has not been recently met with. In Great Britain this species has occurred as far north as Aberdeen. Distribution—northern and central Europe, Siberia.

A. rufocincta, Dej.

LEINSTER. MUNSTER.

Dublin (Portmarnock, '54 Ds. ; North Bull sands, Ds. ; '00 Ht. 3 ; River Dodder banks between Templeogue and Tallaght, Ht.).—Kerry (Rossbehy, Ds.).

Recorded by Dawson and others as *A. brunnea*, Dej. This mistake was corrected by Mr. E. C. Rye (vide Ent. Ann. 1864, p. 32).

A. bifrons, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B. ; Rathmullan, Wr. ; Coolmore, '94 J. Ht. Cr.).—Antrim (Portballintrae, '94 T. ; Portrush, '97 J. 1).—Fermanagh (Tempo, L.).—Galway (Kilkieran Bay, Wr.).—Louth (Greenore, '88 J. 1).—Dublin (Portmarnock, '53 Hn.).—Waterford (Tramore, Ht.).—Cork (Rosscarbery, '95 C. 1).—Kerry (Ballybunion, '98 C.).

A. ovata, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Armagh, Fermanagh, Roscommon, Galway, Louth, Dublin, Wexford, Cork, Kerry.

Frequent.

A. similata, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (south, B.).—Armagh ('00 J. 2).—Dublin ('53 Hn. ; Skerries, '93 Sp. ; Dundrum, Crumlin, Ht.).—Galway (Kilkieran Bay, Wr.).—Wicklow (Bray, Ht.).—Wexford (C.).—Limerick (H. MS.).

A. acuminata, Payk.

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Louth, Dublin, Limerick, Waterford.

A. tibialis, Payk.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B. ; Coolmore, '94 J. Ht. Cr.).—Antrim and Down (Portballintrae, '87 J. 1 ; near Belfast, '85 H. ;

Newcastle, Ch.).—Dublin ('53 Hn.; Dalkey Hill and North Bull, H. MS.).—Kerry (Ballybunion, '98 C.; Rossbehy, '71 S.).

***A. lunicollis*, Schiod.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Roscommon, Galway, Dublin, Wicklow, Wexford, Waterford, Cork.

Frequent.

***A. familiaris*, Duft.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Mayo (Achill), Dublin, Clare, Limerick, Waterford, Cork, Kerry.

***A. lucida*, Duft.**

ULSTER. LEINSTER.

Donegal (Portsalon, '94 J. 2; Coolmore, '00, J. 2).—Down (near Belfast, '85 H.).—Armagh ('00 J. 2).—Dublin ('00 Ht. 3).

Rare.

***A. trivialis*, Gyll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***A. communis*, Panz.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***A. plebeia*, Gyll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Ardara, '92 J. 2; Coolmore, '95 J. 1).—Antrim (Rathlin, '97 Hr.; Dunluce, '94 J. 2, &c.).—Down (Holywood, H. MS.; Strandtown, '00 J. 4).—Galway (Clonbrock, D.).—Louth ('94 J. 2).—Dublin ('53 Hn.).—Wexford ('94 J. 2).—Limerick (H. MS.).

***Calathus cisteloides*, Panz.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*C. fuscus*, F.—Requires confirmation as an Irish species. It has been erroneously recorded from the following localities:—Portsalon, Ardara, Coolmore, Whitepark Bay, Newcastle, Greencastle, Greenore, and Tramore.]

C. flavipes, Fourc.

ULSTER. LEINSTER.

Antrim (Rathlin, '97 Hr.; Cushendun, '94 J. 2).—Down (Newcastle, Ch.).—Meath (Laytown, '94 D.N.F.C.).—Dublin (south, C.; Portmarnock, '53 Hn.; Ht.).

Coast sandhills.

C. mollis, Marsh.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. melanocephalus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. The Alpine variety, *nubigena*, Hal., has been taken in the following localities :—Donegal and Derry (Foyle dist., '00 B.; Teelin Bay, '80 Wr.; Coolmore, '94 J. Ht. Cr.).—Antrim (Cave Hill and Carrickfergus, Wr.).—Down (near Belfast, '85 H.; Slieve Donard, '39 H.).—Cavan (Slieve Glah, '94 J. Ht. Cr.).—Sligo (Ben Bulbin, &c., Ht.).—Mayo (Achill, summit of Slievemore to sea-level, '98 Ht. 2).—Galway (Great Aran, '93 Bn.; Roundstone, Ht.).—Dublin (mountains, C. and Ht.).—Wicklow (Douce, '97 Bk.; Lugnaquilla, '39 H.; '96 Ht. 1).—Cork (Durse, '94 J. Ht. Cr.).—Kerry (Ballybunion, '98 C.; Beginnish, '98 Ht. 3; Kenmare, '98 Ht. 4). First described by Haliday, from specimens taken on the summit of Lugnaquilla. It is very widely distributed in Ireland, occurring in the plain as well as on high ground. The lowland specimens, however, are not nearly so dark as those from the mountains.

C. micropterus, Duft.

ULSTER.

Donegal (mountains, '68 Sm.; Buncrana, '95 Wr.).—Antrim (Carrickfergus, Wr.).

Rare. Recorded from the following localities in error :—Ardara, Portballintrae, Cushendun, Portrush, Clandeboy, Ballynahinch, Armagh, Carlingford.

C. piceus, Marsh.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Tyrone, Armagh, Fermanagh, Cavan, Galway, Louth, Dublin, Wicklow, Kerry.

Under moss, generally in woods.

***Taphria nivalis*, Panz.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Fermanagh, Sligo, Galway, Louth, Dublin, Wicklow, Clare, Waterford, Cork, Kerry.
Frequent on high ground.

***Pristonychus terriicola*, Herbst.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B. ; Narin, '99 J. 3).—Down (near Belfast, '85 H. ; Belvoir Park, Sn.).—Armagh ('87 J. 1 ; Poyntzpass, '97 J. 4).—Fermanagh (Tempo, L.).—Louth (Killincoole, Jn.).—Dublin ('53 Hn. ; North Bull, Ht.).—Queen's County (Abbeyleix, Bn.).—Cork (Bn.).—Kerry (Valentia, Dp.).

In cellars and outhouses. From its habits not easily noticed. There is no record from the west, but it probably occurs in many other localities.

***Sphodrus leucophthalmus*, L.**

ULSTER. LEINSTER.

Antrim (Island Magee, a single specimen in a collection made by Mr. Donaldson, of Belfast, '94 J. 2).—Louth ('92 C. 1 ; Termonfeckin and Drogheda, '94 J. 2, coll. C.).—Dublin (Dublin and Malahide, '53 Hn. ; Blackrock, '94 J. 2, coll. C.).

Mr. Cuthbert's are the only recent captures of this beetle ; it is decidedly rare, and in habits resembles the preceding species, frequenting cellars and outhouses. Canon Fowler mentions that it is particularly attached to baker's premises.

***Anchomenus angusticollis*, F.**

ULSTER. LEINSTER.

Donegal and Derry (Foyle dist., '00 B. ; Milford, coll. Osb. ; Rathmullan, Wr. ; R. Erne, near Ballyshannon, '94 J. Ht. Cr.).—Antrim and Down (Cushendun, '90 J. 2 ; Ram's Island in Lough Neagh, Orr. ; near Belfast, '85 Pn. ; '85 H.).—Fermanagh (Lower Lough Erne, Ca.).—Meath (Beauparc, '93 C. 3).—Wicklow ("Bahana and Glencree," Fg. MS. ; Powercourt, Fg. MS. ; '97 Bk.).—Queen's County (Abbeyleix, Bn.).—Carlow (R. Barrow banks, near Borris, abundant, '95 Ht. 8).

Locally common on river banks.

A. dorsalis, Mull.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

A. albipes, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common; especially abundant on lake shores in the west of Ireland.

A. oblongus, Sturm.

ULSTER. LEINSTER. MUNSTER.

Antrim and Down (Portmore Lake, Orr.; Cranmore, '85 Pn.; near Belfast, '85 H., Shane's Castle, L. Neagh, coll. B.).—Armagh ('82 J. 2).—Fermanagh (Belleisle, '98 Pr.).—Cavan (Lough Oughter shore, '94 J. Ht. Cr.).—Louth (near Dundalk, Sp.).—Dublin (rare, '53 Hn.).—Wexford (Courtown, '92 C. 6; Ht.).—Waterford (Dunmore, Wr.).—Limerick (King's Island, abundant, Fg. MS.).

Local; usually on lake shores.

[*A. livens*, Gyll.—The record, "Glenarm locally abundant" ('78 Br.), requires confirmation; we are unable to trace the specimens, and Mr. Brunton does not say whether his insects were examined by a coleopterist.]

A. marginatus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common; varies a good deal in colour.

A. parumpunctatus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*A. gracilipes*, Duft.—The records, Armagh ('88 J. 2); Ardara ('92 J. 3, '93 J. 1) should have referred to the preceding species.]

A. atratus, Duft.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Ardara, '00 J. 2; Rathmullan, Wr.).—Louth (Garrolagh, '94 J. 2, coll. C.).—Wexford (shore of Slaney estuary, Ht.).—Cork (Queenstown, Wr.).—Kerry Kenmare, Ht.).

Rare; marshy places, and in damp moss.

***A. viduus*, Panz.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim, Down, Armagh, Fermanagh, Cavan, Roscommon, Sligo, Mayo, Galway, Louth, Westmeath, Dublin, Queen's County, Wexford, Clare, Limerick, Cork, Kerry.

The variety *mæstus*, Duft, is generally of much more frequent occurrence than the type.

***A. versutus*, Gyll.**

MUNSTER.

Clare (near Killaloe, '71 S.).

***A. micans*, Nic.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Lough Neagh (H. MS.).—Mayo (Ballina, '71 S.).—Dublin (Dodder banks, '53 Hn.).—Limerick (Fg. MS.).—Waterford (Dunmore, Wr.).—Cork (Queenstown, Wr.).—Kerry (bed of the Laune, '55 Hn. 2).

We have never seen an Irish example of this species. *A. fuliginosus*, Panz., has been mistaken for it in the following records:—Armagh ('88 J. 2; '92 J. 3). Lough Oughter ('94 J. Ht. Cr.). Dublin and Wicklow ('94 J. 2). Borris ('95 Ht. 8). Very possibly some of the older records are also erroneous.

***A. fuliginosus*, Panz.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Fermanagh, Armagh, Cavan, Sligo, Galway, Louth, Dublin, Wicklow, Carlow, Kerry.

Common.

***A. gracilis*, Gyll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Monaghan, Sligo, Mayo, Galway, Louth, Dublin, Kildare, Clare, Cork, Kerry.

Frequent in damp localities.

***A. piceus*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Monaghan, Cavan, Roscommon, Galway, Meath, Dublin, Waterford, Cork.

Rarer than the preceding species.

[*A. Thoreyi*, Dej.—The record, Armagh ('92 J. 3), is to be referred to *A. picus*, L.).

***A. puellus*, Dej.**

ULSTER. LEINSTER. MUNSTER.

Derry (Foyle dist., '00 B.).—Armagh ('94 Sp.).—Carlow (Borris, '95 Ht. 8).—Cork (Rosscarbery, '95 C. 1).—Waterford (Woodstown, coll. Nl.).

Rare.

***Olisthopus rotundatus*, Payk.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (common), Derry, Antrim (Rathlin), Down, Armagh, Fermanagh, Sligo, Galway (Leenane), Louth, Dublin, Wicklow (Carrick Mt.), Wexford, Clare, Kerry (Beginnish, Kenmare).

Common on high ground.

***Gillenus lateralis*, Sam.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Buncrana, '95 Wr.).—Down (near Belfast, '85 H.; Strangford and Dundrum Bay, Fg. MS.).—Mayo (Ballinakill Harbour, coll. Fn.).—Dublin (Portrane, '37 H.; Baldoyle, '53 Hn.; '94 Ht. 3; Portmarnock, H. diary).—Waterford (Tramore, '00 J. 2, Back Strand, Ht.).—Kerry (shore at Carragh Creek, '55 Hn. 2; Kenmare, '98 Ht. 4).

Locally distributed on the coast, occurring between tide-marks. Mr. Haliday, in a note on this interesting species, writes as follows:—"They prey upon sandhoppers (*Talitrus Locustra*, Leach.), seizing them by the soft parts of the underside, and, in this way, are able singly to master game many times their own bulk. Sometimes three or four beetles may be found in concert attacking a sandhopper of the largest size. The tide retiring has scarcely uncovered the sand, when these little depredators are abroad from their hiding-places and alert in the chase." Distribution—local on the coasts of England (south especially) and Wales, Scotland (south). Reitter records it from the coasts of west-central Europe.

***Bembidium rufescens*, Guer.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

B. quinquestriatum, Gyll.

ULSTER. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Ballycastle, T.).—Down (near Belfast, '85 H.).—Armagh ('88 J. 2).—Fermanagh (Belleisle, '98 Pr.).—Dublin (Dodder banks, '53 Hn.; Stillorgan, '92 C. 1; North Bull, Ht.).

Not common.

B. obtusum, Sturm.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim (Rathlin), Down, Armagh, Roscommon, Louth, Dublin, Clare, Cork, Kerry.

Common on river banks.

B. guttula, F.

ULSTER. LEINSTER. MUNSTER.

Antrim (Rathlin, '97 Hr.).—Louth (south), and Dublin (south, '94 J. 2, coll. C.).—Wicklow and Wexford ('94 J. 2, coll. C.).—Limerick (Fg. MS.).—Kerry (Reeks, '32 St.).

We are unable to trace the specimens from which these records were made, and suspect that some of them may be erroneous. The record, Clonbrock ('96 Ht. 2), is founded on an imperfect specimen of *B. Mannerheimi*, Sahl.

B. Mannerheimi, Sahl.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

B. biguttatum, F.

ULSTER.

Antrim (Rathlin, '97 Hr.; Cranmore, '85 Pn.).—Waterford (Monovollough Mountains, '32 St.).

[*B. riparium*, Ol.—The records, south Louth, south Dublin, and Wexford ('94 J. 2, coll. C.), require confirmation, as the specimens cannot be traced in Mr. Cuthbert's collection.]

B. seneum, Germ.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Milford, coll. Osb.).—Down (near Belfast, '85 H.).—Tyrone (Benburb, '00 J. 2).—Armagh

('91 J. 2).—Fermanagh (Belleisle, '98 Pr.).—Roscommon (banks of the R. Suck, '98 Ht. 1).—Louth ('94 J. 2).—Dublin ('53 Hn.; Portmarnock, '00 Ht. 3).—Cork ('94 J. 2; Mallow, Ht.).—Kerry (Ballybunion, '98 C.; Castlemaine River, '55 Hn. 2).

Locally common.

B. assimile, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Shane's Castle, coll. B.).—Down (near Belfast, '85 H.).—Galway (Wr.; Clonbrock, '96 Ht. 2).—Dublin (local, '53 Hn.).—Clare (Killaloe, '71 S.).—Kerry (Castlemaine River, '55 Hn. 2; Kenmare, Cs.).

Rare. The record, Skerries ('94 J. 2), is to be deleted.

B. Clarki, Daws.

ULSTER.

Antrim (Ram's Island, L. Neagh, J., coll. Orr.).—Armagh (Mullinure, '87 J. 1).—Monaghan (Scotstown, '00, J. 2).

Common near Armagh, where it occurs in damp moss in company with *B. doris*, Panz. The record, Coolmore ('94 J. Ht. Cr.), is to be deleted. Local in Great Britain, from Kent to the Tweed district, and on the Continent it has been recorded from Germany (Pomerania), Sweden, and western Europe.

B. doris, Panz.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Derry (Foyle dist., '00 B.).—Antrim and Down (Toome, Orr, near Belfast, '85 H.).—Armagh ('92 J. 1; Coney Island, L. Neagh, '00 J. 2; Loughgilly, '94 J. 2, &c.).—Roscommon (Lough Ree, '98 Ht. 1).—Dublin ('78 M.; Glencullen, '92 Bn. & C.).—Wicklow ('93 Bn. & C.).—Waterford (Tramore, Ht.).—Kerry (Killarney, '71 S.).

B. minimum, F.

ULSTER. CONNAUGHT.

Donegal and Derry (Foyle dist., '00 B.; Rathmullan, Wr.).—Down (? near Belfast, '85 H.).—Sligo (south shore of Sligo Bay and Enniscrone, J.).—Clare (Ballyvaughan, '95 Ht. 6).

The Clare specimens occurred under stones close to high-water mark, those at Enniscrone under rejectamenta in a similar position. The "*Lopha pusillus*?" of Haliday's list may have been intended for the present species.

B. normannum, Dej.

CONNAUGHT. LEINSTER. MUNSTER.

Mayo (Westport, Wr.).—Dublin (Portmarnock, '00 Ht. 3).—Waterford (Tramore, Ht.).

Locally abundant in salt marshes. The record, Bundoran ('94 J. 2), is to be deleted. Abroad this species is found on the coasts of Holland, France, and the Mediterranean region.

[*B. Schuppeli*, Dej. The record, "Ireland" ('94 J. 2), is to be referred to the following species.]

B. gilvipes, Sturm.

MUNSTER.

Cork (Queenstown, Wr.). Ireland (H. coll.).

The Haliday specimen is now in the Dublin Museum collection.

B. lampros, Herbst.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

B. tibiale, Duft.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Cushendun, '00 J. 2).—Armagh (R. Cusher near Tanderagee, '95 J. 2).—Fermanagh (Tempo, L.).—Dublin (Dodder banks, '53 Hn.; mountain streams, '93 C. 1; Ht.).—Wicklow (Bray, Ch. and Ht.).—Clare (Cratloe and L. Derg near Killaloe, Ht.).

Local on river banks.

B. atrocæruleum, Steph.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

B. decorum, Panz.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Leitrim, Galway, Louth, Meath, Dublin, Wicklow, Cork, Kerry.

Common.

B. nitidulum, Marsh.

ULSTER. LEINSTER.

Donegal (Coolmore, '94 J. Ht. Cr.).—Antrim (under stones in disused quarries at Cave Hill, B.).—Dublin (banks of the Dodder, near Templeogue, Ht.).

B. affinis, Steph.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Colin Glen, coll. B.).—Armagh ('87 J. 1).—Louth ('94 J. 2, coll. C.).—Dublin (Dodder banks near Templeogue, '00 Ht. 3).—Wicklow (Bray, Ch.).—Wexford (Courtown, '94 J. 2, coll. C.).

Not common.

B. monticola, Sturm.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Dublin (Dodder bank near Rathfarnham, Bk.).—Limerick (Fg. MS.).

Distribution—central Europe, and in Great Britain from English midlands to the Tay district.

[*B. stomoides*, Dej. Recorded doubtfully by Haliday, from near Greystones ('57 H.). The insect may have been *B. affinis*, Steph., which occurs in this neighbourhood.]

B. quadriguttatum, F.

ULSTER. CONNAUGHT.

Antrim (near Belfast, '94 J. 2, coll. Pn.).—Galway ("Portumna, H." Fg. MS.). Ireland (H. coll.).

In the collection of the Belfast Nat. Hist. and Philosoph. Society, taken by the late R. Patterson, F.R.S. There is an Irish example in the Haliday collection, which may be from the Portumna locality.

B. lunatum, Duft.

ULSTER.

Derry (Magilligan, B.).—Antrim (Rathlin Island, lake shore, '97 Hr.).

Mr. Buckle found it under sea-weed. Ranges from the Clyde district to the English midlands, S. Wales, and abroad over northern and central Europe.

B. concinnum, Steph.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., river banks, '00 B.; near Derry, Bk.).—Dublin (mouth of the Dodder, '53 Hn.).—Wicklow (Bray, H. MS.).—Limerick (Shannon estuary, '54 Ds.).—Kerry (south shore of

Dingle Bay, '55 Hn. 2; Killorglin, H. MS.; shore of Kenmare Bay, '94 Ht. 4).

Very local, occurring usually on the banks of estuaries. On the Continent it has been recorded from the coasts of the North Sea and the English Channel.

***B. femoratum*, Sturm.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Antrim and Down (shore of L. Neagh at Shane's Castle, '85 Pn.; Castlewellan, '85 Pn.; near Belfast, '85 H.; Lagan Canal, B.).—Armagh (Maghera, L. Neagh; Tynan, '95 J. 2; Loughgall, '00 J. 2).—Louth (Greenore, '98 J.).—Dublin (Killiney, '53 Hn.; Kingstown, '94 J. 2; Skerries, '93 Sp.; bed of the Dodder, Ht.).—Wicklow (Blessington, Ht.).—Wexford (Courtown, '92 C. 6).—Kerry (Gap of Dunloe, Hr.).

Not common. The record, Coolmore ('94 J. Ht. Cr.), is to be deleted. Some authors consider this species to be a mere variety of *B. Andreae*, Favr.

***B. bruxellense*, Wesm.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Armagh ('87 J. 1; Loughgilly, '94 J. 2; Poyntzpass, '00 J. 4).—Fermanagh (Belleisle, '97 Pr.; Tempo, L.).—Cavan (Lough Oughter shore, '94 J. Ht. Cr.).—Mayo (Island Lough, Ballyhaunis, Sp.).—Galway (Roundstone, Ht.).—Dublin ('53 Hn.).—Kildare (Maynooth, '94 C. and Cr.).

Rather local.

***B. saxatile*, Gyll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Galway, Louth, Dublin, Wicklow, Wexford, Kerry.

Plentiful where it occurs, and more widely distributed than *B. femoratum*, Sturm.

***B. anglicanum*, Sharp.**

LEINSTER.

Dublin (Dodder banks near Templeogue, '00 Ht. 3).

Found in numbers on one occasion in the month of June, 1895. *B. anglicanum* has been recorded from Scotland and the north of England, but in recent continental works it is treated as a synonym of *B. Andreae*, Fabr., a widely distributed Palearctic species.

B. littorale, Ol.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

B. pallidipenne, Ill.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Coolmore, '94 J. Ht. Cr.; Ardara, '92 J. 3; Buncrana, '95 Wr.).—Antrim and Down (Lough Neagh, 54 Ds.; '85 Pn.; Toome, Orr.; near Belfast, '85 H.).—Sligo (Enniscrone and Rosses Point, J.).—Dublin (near Dublin, '39 St.; Baldoyle, '53 Hn.).—Wicklow (Arklow, '57 H.).—Wexford (Fg. MS.; Courtown).—Waterford (coast, Ht.).—Kerry (Killarney, '54 Ds.; Kenmare, '98 Ht. 4).

In sandy places and on lake shores, often in company with *Dyschirius* and *Bledius*. Rather a local insect, occurring on the coasts of England, Scotland, and western Europe.

B. bipunctatum, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Mayo, Galway, Roscommon, Dublin, Clare, Limerick, Kerry.

B. punctulatum, Drap.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim and Down (Lough Neagh, '85 Pn.; Cushendun, '94 J. 2; near Belfast, '85 H.).—Armagh (Maghery, '91 J. 3; Clay Lake, '87 J. 2).—Louth ("Castletown river," Fg. MS.).—Dublin (Dodder banks and Loughlinstown, '53 Hn.; Friarstown, '93 C. 1; Killiney, Ht.).—Wicklow (Bray River, Ch. and Ht.).—Clare (Killaloe, Ht.).—Waterford (Lismore, '95 Ht. 1).—Leitrim (C.).

Common on river banks.

B. flammulatum, Clairv.

ULSTER. LEINSTER. MUNSTER.

Antrim (Rathlin, '97 Hr.).—Down (Banks of Lagan Canal near Belfast, B.).—Armagh (Lowry's Lough, '87 J. 1; Camlough Lake, '96 J. 1).—Kildare (Maynooth, '94 C. and Cr.).—Kerry (Killarney, Hr.).

Local; under stones, and at roots of plants near water.

B. varium, Ol.**LEINSTER. MUNSTER.**

Dublin (Portmarnock, common under moss on banks of brackish stream, '00 Ht. 3).—Kildare (banks of the Liffey at Celbridge, '53 Hn.).—Wicklow (Newcastle Bog, '94 J. 2, coll. C.).—Wexford (aloblands, Wexford harbour, Sp.).—Limerick (Fg. MS.).

B. argenteolum, Ahr.**ULSTER.**

Armagh (Lough Neagh at Ardmore, J.).

In June, 1899, Mr. Johnson captured, on the shore of Lough Neagh, at Ardmore, several specimens of a *Bembidium* which were referred to *B. paludosum*, Panz., as recorded ('99 J. 2). Examples were sent to the Dublin Museum, and no suspicion of their identity was, at the time, entertained. Quite recently, however, we noticed certain differences in facies between the Lough Neagh insect and English specimens of *paludosum*, which led to a careful comparison with continental types and descriptions. As a result we find that the Ardmore insect is not *B. paludosum*, Panz., but an allied species, *B. argenteolum*, Ahr. We have, therefore, the pleasure of making an interesting addition to the British list. The two species may be easily distinguished through the following characters.

B. argenteolum, Ahr.	B. paludosum, Panz.
Size larger, and of more robust build, upper surface shining bronze. Thorax <i>much</i> broader than long, having the posterior angles sharp and prominent.	Size smaller, very dull bronze. Thorax at most slightly broader than long, posterior angles not prominent.

The Lough Neagh specimens average from 6 to 6.5 mm in length. They are of a comparatively shining bronze colour, with the bases of the femora, tibiæ, and first antennal segments dark red. The apices of the tibiæ, and the upper surface of basal segments of the antennæ, are more or less tinged with greenish bronze. We may add that the Irish examples agree in every detail with specimens in the Dublin Museum collection taken at Hamburg. In life *B. argenteolum* greatly resembles an *Elaphrus*, both in its movements and general appearance. This insect is recorded from Scandinavia, northern and central Europe, including the north of France, and Siberia.

[*B. paludosum*, Panz.—Antrim (shore of Lough Neagh at Shane's Castle, '38 Pn.; Lough Neagh, '54 Ds.; near Belfast, '85 H.).—Kerry ('54 Ds.).

The rediscovery of this species is specially desirable. We have seen the supposed specimens of *B. paludosum* in the Belfast Museum, probably the original specimens taken by R. Patterson, and find they are in reality the preceding species. We have no doubt the record, "near Belfast" ('85 H.), refers to the Lough Neagh locality, as Haliday does not seem to have taken the species personally (*vide* H. MS.). Confirmation of the Kerry record seems desirable. Distribution—northern and central Europe, Siberia, and in North America; in Great Britain "it is mostly a northern species, and does not seem to be found in the south" (Fowler).]

***Tachypus pallipes*, Duft.**

ULSTER.

Donegal (Coolmore, '97 L. 2).

Taken in numbers by Mr. C. Langham, June, 1896.

***T. flavipes*, L.**

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; near Derry, Bk.).—Dublin ('55 Hn. 1; Banks of Dodder, near mouth, '56 Hn. 1; Killiney beach, '78 M.; Kingstown, '91 F. 1; Shanganah, '94 J. 2; &c.).—Wicklow (Bray, 94 J. 2, coll. C.).—Cork (Fg. MS.).—Kerry (Great Blasket, '55 Hn. 2; Muckcross, Hr.; Kenmare, Fg. MS.).

Local.

***Aëpus marinus*, Ström.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Down (Strangford Lough, '55 H. 1).—Galway (Ballinakill, Fn.).—Louth (Clogher Head, '94 J. 2 coll. C.).—Dublin (North Bull, '56 Hn. 1; Dollymount, '00 Ht. 3).—Cork (Glandore, Ht.).

Locally common between tide-marks.

***A. Robinii*, Lab.**

MUNSTER.

Cork (Owenbeg River, Cork Harbour and Passage, '55 H. 1).—Kerry (shore near Dingle, '94 J. 2).

Rare. The Dingle specimen was taken on the shore near Burnham

by Dr. R. F. Scharff in May, 1894. Haliday remarks ('54 H. 1) that he found this species confined to parts of the coast, between tide-marks, where clay comes to the surface. This interesting species has been recorded from a few places in the north and south of England, the Tweed and Forth districts, and the coast of France.

Trechus discus, F.

CONNAUGHT.

Galway (Ahascragh, '96 Ht. 2).

A single example taken on the banks of the River Suck, near this locality, towards the end of June, 1896. Canon Fowler records this species only from the midland counties of England. Northern and central Europe (Ganglbauer).

T. micros, Herbst.

ULSTER. MUNSTER.

Derry (Magilligan, B.).—Armagh ('92 J. 1 & 4).—Tipperary (Mitchelstown Cave, '96, Jn.).

In flood refuse. Mr. Jameson captured it under stones in the Mitchelstown Cave.

T. lapidosus, Daws.

ULSTER. LEINSTER.

Donegal (Coolmore, '94 J. Ht. Cr.).—Down (shore at Holywood, '54 Hn.).—Louth (Bellurgan, '90 J. 2).—Dublin (Killiney, '54 Hn.—Wicklow (Bray, Ch.).

Rare; under stones on the coast, and at mouths of tidal rivers. In most of the above localities only single specimens were met with.

T. rubens, F.

ULSTER. LEINSTER. MUNSTER.

Donegal (under turf stack Glencaw mountain, '00 B.; Milford, coll. Osb.; Ardara, '92 J. 3; Buncrana, '95 Wr.).—Down (near Belfast, '85 H.).—Dublin (Clontarf and Killiney, '53 Hn.; Bull sands, H. diary).—Cork (Kanturk, '47 W. 1).—Kerry (Great Blaasket Island, '55 Hn. 2).

Rare; recorded in the Belfast and Kanturk lists as *Blenus paludosus*.

T. minutus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

The type form is by no means common, being largely replaced by the variety *T. obtusus*, Er., especially in mountain districts.

Patrobus excavatus, Payk.

ULSTER. LEINSTER. MUNSTER.

Donegal (Horn Head, '85 Pn.).—Antrim and Down (Collinward Hill, Glengormley, B.; near Belfast, '85 H.; Rostrevor mountain, '85 Pn.).—Dublin (56 Hn. 1; Stepside Sp.).—Kerry (Conor Hill and Brandon, '55 Hn. 2).

Rare; the following being much the commoner species in Ireland. The record, Dublin mountains ('92 C. 1), is to be referred to *P. assimilis*, Chaud. Distribution—northern and central Europe, Siberia.

P. assimilis, Chaud.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Buncrana '95, Wr.; Ardara, '00 J. 2).—Antrim and Down (Rathlin, '97 Hr.; Cave Hill, B.; Newcastle, '94 J. 2 call. ch.).—Louth (Carlingford, '00 J. 2).—Dublin (mountains, '95 Ht. 3).—Wicklow (Lugnaquilla, '96 Ht. 1; Douce, '97 Bk.).—Cork (Berehaven, Wr.).—Kerry (Carrantuohill, over 2700 ft., '99 Sch. & Cr.).

Common on hills. The record, Maghery ('00 J. 2), is to be deleted. *P. assimilis* is locally common in mountain districts in the northern parts of England, and in the Highlands. On the Continent it has been recorded from Germany, Sweden, and Finland (Ganglbauer). Siberia (Heyden).

Pogonus littoralis, Duft.

LEINSTER.

Louth (Clogher Head, '92 C. 1).—Meath (Boyne estuary, '92 C. 1).—Dublin (Malahide, '94 J. 2, coll. Sch.).

P. chalcus, Marsh.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (Strangford Lough, B.).—Mayo (Ballina, '71 S.).—Galway (Gentian Hill, '95 Ht. 6).—Louth (Carlingford, '88 J. 1; Greenore, '00 J. 2; Clogher Head, '92 C. 1).—Meath (Mornington, '94 D.N.F.C.).—Dublin (Baldoyle and Portrane, '53 Hn.).—Waterford (Tramore, Ht. 1).—Kerry (Dingle, Ht.; Kenmare, '98 Ht. 4).

Common where it occurs on the sea coast.

***Cymindis vaporariorum*, L.**

ULSTER. CONNAUGHT.

Donegal (mountains, '68 Sm.; Wr.).—Mayo (Minnaun Cliffs on Achill Island, '98 Ht. 2; Croagh Patrick, Sp.).

Rare; occurs amongst heather. Distribution—northern Palæ-arctic region, and mountain districts of central Europe.

***Lebia chlorocephala*, Hoff.**

ULSTER. LEINSTER.

Donegal (Lough Swilly, '00, J. 2).—Wicklow (Wooden Bridge, "6 June, 1853, 5 p.m. on bridge," Fg. MS.).—Wexford (Fg. MS.).—Ireland ('85 H.).

Very rare. A specimen occurred among some beetles sent by Mr. D. C. Campbell from the shores of Lough Swilly.

***Demetrias atricapillus*, L.**

LEINSTER. MUNSTER.

Louth, Meath, Dublin, Wicklow, Wexford, Waterford, Cork. Coast sand-hills. Occasionally found inland on the banks of tidal rivers as at Enniscorthy and Cappoquin.

[*Demetrias unipunctatus*, Germ. The record, Tower Bridge Nursery ('91 C.), requires confirmation, as the specimens are not now in Mr. Cuthbert's collection.]

***Dromius linearis*, Ol.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***D. agilis*, F.**

LEINSTER.

Dublin ("not uncommon," '53 Hn.).

There have been no recent records of this species, nor have we seen Irish-taken specimens. The record, Stillorgan ('92 C. 1), is to be deleted.

***D. meridionalis*, Dej.**

ULSTER. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim and Down (near Belfast, '85 H.; B.).—Armagh, ('87 J. 1).—Fermanagh (Belleisle, Pr.).—Dublin (Cherrywood and Loughlinstown, '53 Hn.; Rush, '94 C. 2; Howth, J.; Portmarnock, and Tolka Valley, Ht.).

Frequent; an immature example occurred in the centre of a small branch at Armagh.

D. quadrimaculatus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Cavan, Galway, Dublin, Carlow, Kerry.

Common under bark.

D. quadrinotatus, Dej.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Armagh, Roscommon, Galway, Dublin, Wicklow, Kerry.

Under bark, also by beating foliage. Varieties occur having the elytral spots united.

D. melanocephalus, Dej.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist.), Antrim, Down, Armagh, Cavan, Dublin, Kildare, Waterford.

Common.

D. nigriventris, Thoms.

ULSTER. LEINSTER. MUNSTER.

Common.

Metabletus foveola, Gyll.

LEINSTER. CONNAUGHT. MUNSTER.

Meath (mouth of the Boyne, '94 J. 2, coll. C.).—Dublin (Portmarnock, '53 Hn.).—Wexford (south-east, Ht.).—Clare (Lahinch, coll. Gr.).—Kerry (Ballybunion, '98 C.; Rossbeg, '55 Hn. 2).—Ireland ('85 H.).

M. truncatellus, L.

LEINSTER.

Dublin (Portmarnock, '53 Hn.).

Specimens cannot be traced.

Brachinus crepitans, L.

LEINSTER.

Louth and Wexford ('54 Ds.).

There are two examples of this species in the Dublin Museum (from the Trinity College collection) marked as having been taken in Ireland. This is a common species throughout the Palearctic region, but in Great Britain it would seem to be confined to the south of England and Wales.

HALIPLIDÆ.

***Brychius elevatus*, Panz.**

ULSTER. LEINSTER. MUNSTER.

Antrim (Portrush, Pt.).—Armagh (Dean's river, '92 J. 4).—Dublin (Canal, and Loughlinstown, '53 Hn.; Carrickmines, C.).—Wicklow (Arklow, H.).—Kilkenny (Thomastown, Ht.).—Waterford ('78 P.).—Cork (Queenstown, Wr.; Rosscarbery, '95 C. 1).

In running water; not common.

***Haliplus obliquus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (south), Antrim, Armagh (Lough Neagh, &c.), Sligo, Galway, Dublin, Kildare, Wicklow, Clare, Limerick, Tipperary, Waterford, Kerry (north).

Common, especially in the clear water of lakes.

***H. confinis*, Steph.**

ULSTER. LEINSTER. MUNSTER.

Down (Bangor, Ht.).—Armagh ('88 J. 2; Loughgall, '00 J. 2).—Louth (C.).—Dublin (C.).—Wexford (Courtown, '93 C. 4; Forth Hills, Ht.).—Cork (Fg. MS.).—Kerry (Killarney, '47 W. 1).

Much rarer than the preceding.

***H. flavicollis*, Sturm.**

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist. '00 B.).—Tyrone (Lisson, Ht., coll. Pt.).—Down (near Belfast, '85 H.).—Armagh ('88 J. 2; Keady, '00, J. 2).—Dublin (Royal and Grand Canals, '00 Ht. 3).—Wexford (Forth Hills, Ht.).—Clare (Lough Derg, Sp.).—Limerick (Canal, Ht.).

Locally common.

***H. fulvus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***H. variegatus*, Sturm.**

MUNSTER.

Clare (Finlough, Ht.).—Cork ('91 F. 1).

The Cork specimen was sent to Canon Fowler by Mr. C. Donovan.

H. cinereus, Aubé.

The *H. affinis* of Haliday's Belfast list ('85 H.) may have been intended for the present species (see Waterhouse's Catalogue); but the specimens cannot be traced in his collection.

H. ruficollis, De G.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

H. fluviatilis, Aubé.

ULSTER. LEINSTER. MUNSTER.

Donegal (south), Derry, Antrim, Down, Tyrone, Armagh, Roscommon, Clare, Limerick, Tipperary, Cork.

Local.

H. lineatocollis, Marsh.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

PELOBIIDÆ.***Pelobius tardus*, Herbst.**

LEINSTER. MUNSTER.

Wicklow ("in first pond on road from Lara to Rathdrum—old ponds now overgrown" H. MS.).—Clare (Lough Doon, Ht., coll. Nl.).—Cork (Carrigaline, Ht., coll. Ws.).—Ireland (Fg. MS.).

Rare; only two specimens have been found in this country in recent years. One on the shore of Lough Doon, south Clare, by Mr. Arthur Neale (June, 1895), and another in a pond near Carrigaline, by Mr. Dudley Westropp; both of these specimens have been presented by their captors to the Dublin Museum. From notes in Mr. Haliday's MS. list, it is evident that the Wicklow specimens were taken by the late Mr. J. Tardy, and were seen by Mr. Haliday in the Furlong collection in 1849. The species occurs very locally in the south of England, and Wales, and, according to Ganglbauer, it ranges over central Europe, and the Mediterranean region.

DYTISCIDÆ.

***Noterus clavicornis*, De G.**

ULSTER. LEINSTER. MUNSTER.

Antrim (Portmore Lough, H., coll.; Lough Neagh, Fg. MS.; Lagan Canal, B.).—Down (near Belfast, '85 H.).—Armagh ('92 J. 4; Loughgall and Clonmacate, '00 J. 2; Canal near Scarva, '97 J. 1; Moyntuagh Bogs, '85 Pn.).—Fermanagh (Lower Lough Erne, Cs.).—Westmeath (Lough Derravaragh, Ht.).—Waterford (Dunmore, Wr.).
Not common.

***N. sparsus*, Marsh.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Laccophilus interruptus*, Panz.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Coolmore '94 J. Ht. Cr.).—Antrim and Down (Lagan Canal, B.; near Belfast, '85 H.; Holywood, Dn.; Newcastle, '00 J. 3).—Sligo (Rosses Point, J.).—Dublin ('53 Hn.; Royal and Grand Canals, Ht.; Carrickmines, C.).—Kilkenny (Thomastown, Ht.).—Clare and Limerick (Ht.).—Waterford (Lismore, Ht.).—Kerry (Killarney, '47 W. 1).

***L. obscurus*, Panz.**

ULSTER. CONNAUGHT. MUNSTER.

Common.

***Bidessus minutissimus*, Germ.**

LEINSTER. MUNSTER.

Dublin (River Camac near Clondalkin, '00 Ht. 3).—Cork (River Lee, '47 W. 3; '55 Cl.).—Kerry (Sheen River near Kenmare, '00 Ht. 3).

Extremely local. This pretty water-beetle was described as a new species (*H. trifasciatus*—'46 W.) from specimens taken in the River Lee by Mr. Clear. Wollaston, in a more recent note, expresses doubt as to the origin of Mr. Clear's specimens ('69 W. 1). Judging, however, by the above records, it is certain to occur in many more localities, at least in the south of Ireland. In England it has only been found in Devonshire, and abroad it is recorded from south-western Europe, the Mediterranean region, and the Canaries.

***B. geminus*, F.**

ULSTER.

Down (near Belfast, '85 H.).

Hyphydrus ovatus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Lagan Canal, B.).—Lough Neagh (H. MS.).—Armagh ('92 J. 4).—Roscommon (Mote Park, Ht.).—Galway (Clonbrock and Woodford, Ht.).—Dublin (Portmarnock, '53 Hn.; Royal and Grand Canals, Ht.).—Wexford (C.).—Clare and Limerick (Ht.).—Kerry (Killarney, Fg. MS.).

Locally common.

Cœlambus quinque-lineatus, Zett.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Widely distributed and common where it occurs, generally found in still water. It is said to be rather scarce in Great Britain, and in addition to Britain, Ganglbauer mentions only Alsace, Belgium, and Lapland as localities. Siberia.

[*Cœlambus versicolor*, Schall.—Down (near Belfast, '85 H.).—Dublin (Canal, '53 Hn.).—Kerry (River Flesk, Killarney, '47 W. 1).

Inserted on the strength of the *reticulatus* and *collaris* of the above references. Very possibly these records were in reality founded on specimens of *C. v-lineatus*, Zett. The records, Armagh ('87 J. 1; '88 J. 2) are to be referred to the following species (see '88 J. 5).]

C. inæqualis, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. confuens, F.

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Dublin (quarry holes near Lucan and Clontarf, '00 Ht. 3; Loughlinstown, C.).—Limerick (Fg. MS.).
Local.

C. novemlineatus, Steph.

ULSTER.

Donegal (Coolmore, '94 J. Ht. Cr.).—Antrim (Toome, '00 J. 2).—Armagh (Lowry's Lough, '87, J. 1; Marlacoo, J.).—Lough Neagh (H. MS.).

Rare; seems to prefer clear water at edges of lakes, or in drains. It has been recorded from Scotland, N. England, Mecklenburg and Lapland, and Heyden includes it in his Siberian list.

C. parallelogrammus, Ahr.

Ireland (H. coll.).

There is an Irish example in the Haliday collection. The record, Holywood ('92 Pt. & Dn.), requires confirmation, as the specimens—which cannot be traced—may possibly belong to the following species.

C. impressopunctatus, Sch.

ULSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Coolmore, '94 J. Ht. Cr.).—Down (People's Park, '95 Ht. 4; Downpatrick, Ht., coll. Wl.; Dundonald, J.).—Armagh ('94 J. Ht. Cr.).—Waterford ('78 P.).—Kerry (Killarney, '47 W. 1).

Very abundant in drains at Coolmore.

Deronectes assimilis, Payk.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Roscommon, Galway, Westmeath, Dublin, Clare, Limerick.

Frequent, but rather rarer than the following.

D. depressus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Sligo, Roscommon, Westmeath, Dublin, Wexford, Limerick, Kilkenny, Tipperary, Waterford, Cork, Kerry.

Common; varies considerably in colour, some specimens being almost entirely black, or more rarely with the usual dark elytral spots reduced to thin lines.

D. xii-pustulatus, F.

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Dublin, Wicklow, Wexford, Limerick, Tipperary, Waterford, Cork, Kerry.

Local, though so widely distributed; found usually in running water and affecting particular pools in streams.

Hydroporus pictus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

H. flavipes, Ol.

ULSTER.

Down (near Belfast, '85 H.). Taken by Mr. Wollaston in Ireland ('55 Cl.).

The Haliday specimen is in the Dublin Museum collection.

H. lepidus, Ol.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

H. rivalis, Gyll.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Antrim and Down (Lagan Canal, B. ; near Belfast, '85 H.).—Armagh ('88 J. 2).—Dublin (Loughlins-town, '53 Hn. ; mountain streams, Ht.).—Wexford ('93 C. 4).—Waterford ('78 P.).—Cork (Queenstown, Wr.).

H. septentrionalis, Gyll.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Derry (Bk.).—Antrim (Crumlin River, B.).—Armagh (Tanderagee, '95 J. 2).—Dublin (River Dodder, '56 Hn. 1 ; near Rathgar, H. diary ; Glenasmole, '95 D.N.F.C.).—Wicklow (Lower Lough Bray, Ht.).—Cork (Kanturk and Bantry, '47 W. 1 ; Rosscarbery, '95 C. 1).—Kerry (River Flesk, Killarney, 47 W. 1).

Local ; in lakes and streams.

H. Davisii, Curt.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Dublin (stream near the Little Dargle, '00 Ht. 3.).—Ireland (H. coll.).

Found in clear water, sometimes in company with *H. septentrionalis*, Gyll. Apparently a northern and alpine species, occurring in the north of England, Scotland, Scandinavia, Pyrenees, and Alps.

H. lineatus, F.

Antrim, Down, Armagh, Roscommon, Galway, Westmeath, Meath, Dublin, Kilkenny, Wexford, Cork, Kerry.

Common.

H. tristis, Payk.

ULSTER. CONNAUGHT. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Bundoran, '91 J. 1.).—
Armagh (rare, '92 J. 4; Churchill, '00 J. 2).—Mayo (lake near
Delphi, Ht.).—Kerry (Killarney, '47 W. 1; bog-pools near the Upper
Lake, Ht.).

Rare; in ponds on high ground.

H. umbrosus, Gyll.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Cave Hill, B.).—Down
(Mourne mountains, Downpatrick, Ht.).—Armagh ('91 J. 2; Poyntz-
pass, '97 J. 3).—Louth (Carlingford, '91 J. 2).—Westmeath (Lough
Ree, '00 Ht. 1).—Limerick (Lough Gur, Ht.).

H. angustatus, Sturm.

ULSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Bog Meadows near
Belfast, Dn.).—Armagh ('00 J. 2).

Rare.

H. Gyllenhali, Schiod.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Mayo, Louth, King's
County, Wexford, Waterford, Kerry.

Not uncommon where found; inhabits bog-pools.

H. morio, Dej.

ULSTER.

Donegal (Foyle dist., '00 B.).—Armagh ('87 J. 1; Newtown
Hamilton, '00 J. 2).

Rare. The records, Ardara ('85 J. 3), and Holywood ('92 J. 5), are
to be deleted.

H. vittula, Er.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Bundoran, '91 J. 1.).—
Antrim and Down (swamp near Lagan Canal, '00 J. 3; B.; Holy-
wood, Dn.).—Armagh ('92 J. 4).—Dublin (ponds near Lucan, '00
Ht. 3).—Waterford ('78 P.).—Kerry (Killarney, '87 F.).

Locally common.

H. palustris, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common; varies a good deal in the extent of the yellow markings.

H. incognitus, Sharp.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Antrim and Down (Cave Hill and Lagan Canal, coll. B.).—Wexford (River Slaney near Enniscorthy, Ht.).—Kerry (Kenmare, Ht.).—Clare (Lahinch, Ht., coll. Gr.).

Not common, but widely distributed. The record, Armagh ('89 J. 5), is to be deleted. In Great Britain this species has been found rarely in the south, and as far north as the Moray district. No doubt it is overlooked in many localities, owing to its resemblance to dark varieties of *H. palustris*, L. Ganglbauer records it from France and Belgium.

[*H. melanarius*, Sturm.—The record, Downhill ('00 B.), is due to a clerical error.]

H. erythrocephalus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*H. rufifrons*, Duft.—Requires confirmation as an Irish species. The "*rufifrons*" of the Haliday and Wollaston lists ('85 H.; '47 W. 1) was probably *H. Gyllenhali*, Schiod. The record, Friarstown ('93 C.), is to be deleted.]

H. longulus, Muls (*colatus*, Clark.).

ULSTER.

Derry (Downhill, '00 B.).

A single specimen taken by Mr. J. N. Milne, and named "*colatus* var." by Dr. Sharp.

H. memnonius, Nic.

ULSTER. CONNAUGHT. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.; Milford, Osb.).—Antrim (Lough Neagh, Orr.).—Armagh ('88 J. 5).—Galway (Clonbrock, '96 Ht. 2.).—Dublin (Howth, M.).—Clare (Lahinch, coll. Gr.).

Not common.

H. obscurus, Sturm.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Cavan, Mayo (Achill, &c.), Galway, King's County, Kerry.

Occurs in highland districts, and in bogs; rare in Leinster.

H. nigrita, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Galway, Dublin, Carlow, Wexford, Tipperary, Kerry.

Common.

H. discretus, Fairm.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Coolmore, '00 J. 2).—Derry (Downhill, Ht.).—Antrim and Down (Belfast dist., B.; Stormount '00 J. 3).—Dublin (Royal Canal, '00 Ht. 3).—Wexford (ponds near Enniscorthy, Ht.).—Clare (Lahinch, Ht., coll. Gr.).

Common in some localities in the north.

H. pubescens, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

H. planus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Mayo, Galway, Dublin, Wexford, Waterford, Cork, Kerry.

H. lituratus, F.

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Cavan, Louth, Dublin, Clare, Wexford, Kerry.

[*H. ferrugineus*, Steph.—The record, Armagh ('87 J. 1), is to be deleted.]

H. obsoletus, Aubé.

ULSTER.

Derry (Foyle dist., coll. B.).—Down (north shore of river between Comber and Strangford Lough, October, 1901, coll. B.).

Found in both of these localities by Mr. C. W. Buckle. Though of

northern range in the British Islands, this species has been found only in the western parts of central Europe, and in the Mediterranean region.

***Agabus guttatus*, Payk.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Carrickfergus, Wr.).—Down (Belfast, B.; Holywood, '92, Pt. and Dn.).—Armagh ('88 J. 2.).—Sligo (Glencar Lake, Sp.).—Galway (Wr.).—Dublin (Dundrum, '00 Ht. 3.).—Wexford (Courtown, '92. C. 6.).—Kerry (Lough Eagher under Carrantuohill, '99 Sch. and Cr.; Kenmare, coll. Yr.).

***A. biguttatus*, Ol.**

ULSTER.

Armagh (rare '92 J. 1).

***A. paludosus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Sligo, Roscommon, Meath, Dublin, Wexford, Clare, Cork, Kerry.
Common.

***A. affinis*, Payk.**

ULSTER. CONNAUGHT.

Donegal (Coolmore, on the beach, J.).—Galway (Leenane, in flood refuse from the Erriff River, April, 1897, Ht.).

A northern species; occurring over northern and central Europe, Siberia, and in Scotland.

***A. unguicularis*, Thoms.**

ULSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Coolmore, '95 J. 1).—Antrim (Bog meadows, Dn.).—Down (Downpatrick, Ht.).—Armagh ('87 J. 2; Keady, '88 J. 2; Poyntzpass, '97 J. 3).—Clare (Lahinch, coll. Gr.).

[*A. congener*, Payk.—The record, Carlingford ('88 J. 1), should have referred to *A. Sturmii*, Gyll.]

***A. nebulosus*, Forst.**

ULSTER. CONNAUGHT. LEINSTER.

Common in the province of Ulster, and has been found in the counties of Mayo, Roscommon, Galway, Louth, Dublin, and Wexford.

A. femoralis, Payk.

CONNAUGHT.

Roscommon (River Suck near Mount Talbot, '98 Ht. 1).

A. arcticus, Payk.

LEINSTER.

Wicklow (Kippure, '97 Ht. 1).

Mr. G. P. Farran found two examples of this northern water-beetle in a small pool near the summit of Kippure. It has been recorded from northern Europe, Arctic Siberia, North America, and Alsace ('82 Sh.). Ganglbauer, however, does not mention it as a central European species, nor is it included in the French fauna. In Scotland it is a characteristic Highland species; it has been traced only as far south as Northumberland in Great Britain.

A. Sturmii, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

A. chalconotus, Panz.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Derry (Foyle), Down, Roscommon, Dublin, Wicklow, Wexford, Clare, Kerry.

A. bipustulatus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

Platambus maculatus, L.

LEINSTER.

Kilkenny (Kilmacow, Nl.). Ireland (Fg. MS.).

Mr. A. Neale informs us—after seeing this species in the Museum collection—that he found specimens in the first-mentioned locality.

Ilybius fuliginosus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

I. ater, De G.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.; Coolmore, '94 J. Ht. Cr.).—Armagh ('92 J. 4).—Fermanagh (Belleisle, '98 Pr.).—Dublin ('53 Hn.).—Wexford (Courtown, '92 C. 6).

Not common.

I. obscurus, Marsh.

ULSTER. LEINSTER.

Down (near Belfast, '85 H.; Carnagaver, Dn.).—Armagh ('92 J. 4; Loughgall, '00 J. 2).—Fermanagh (Belleisle, '98 Pr.).—Dublin (Royal Canal, '00 Ht. 3).

I. guttiger, Gyll.

LEINSTER.

Dublin ("a single specimen at Kingstown," '53 Hn.; River Dodder at Oldtown, Lk., coll. C.).

I. senescens, Thoms.

LEINSTER. MUNSTER.

Dublin ("Foxrock, &c.," '53 Hn.; Dublin mountains in quarries, C.).—Waterford ('78 P.).

Rare; recorded in the Dublin and Waterford lists as "*angustior*, Gyll."

Copelatus agilis, F.

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Wexford (River Slaney near Enniscorthy, Ht.).—Cork (Blarney, Wr.).

Very rare.

Rhantus oxoletus, Forst.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (Newcastle '00 J. 3).—Armagh ('92 J. 4; Clonmacate, J.).—Fermanagh (Belleisle, '98 Pr.).—Roscommon (Lough Ree, '98 Ht. 1).—Wexford (Enniscorthy, Ht.).—Waterford (coll. Nl.; Dunmore, Wr.).

Lakes and drains. The record, Ardara ('92 J. 3), should refer to *R. bistriatus*, Berg.

R. notatus, Berg.

ULSTER. MUNSTER.

Derry (Foyle dist., '00 B.; Milford, coll. Osb.).—Armagh ('87 J. 1).—Fermanagh (Belleisle, '98 Pr.).—Tipperary (Nenagh, Sp.).

R. bistriatus, Berg.

ULSTER. LEINSTER.

Donegal (Milford, coll. Osb.; Buncrana, '95 Wr.; Ardara, '00 J. 2; Coolmore, '95 J. 1).—Derry (Foyle dist., '00 B.).—Wicklow (Kippure, '00 Ht. 3).—Wexford (Forth Hills, Ht.).

***Colymbetes fuscus*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster; and has been found in the counties of Roscommon, Galway, Louth, Dublin, Wicklow, Wexford, Waterford and Cork.

***Dytiscus punctulatus*, F.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Fermanagh, Cavan, Dublin, Wicklow, Kerry, Cork.

Common.

***D. marginalis*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, occasionally found in brackish or even in salt water pools amongst sea-weed.

***D. circumcinctus*, Ahr.**

ULSTER.

Armagh ('89 J. 1).

This fine species was taken sparingly in drains near Armagh and at Lowry's Lough.

***D. lapponicus*, Gyll.**

ULSTER.

Donegal (mountain tarns, '68 Sm.).

Found in numbers in Donegal tarns in the August of 1867—in company with *Acilius sulcatus*, *Gyrinus natator*, and *G. minutus*. Unfortunately the exact locality where this rare insect occurred is unknown, and it has not been met with since in Ireland. Dr. Sharp records it from the Moray, Clyde, and Argyll districts of Scotland, Northern Europe, "extending southwards in the mountains to the Basses Alpes, and Northern Italy," and Siberia ('82 Sh.). It is supposed to prey on newts in the Scotch lakes.

[*Hydaticus transversalis*, Berg.—In Mr. Haliday's MS. list, the note on this species indicates that it was seen in the Tardy collection by Mr. Haliday—but it is not included amongst the "certainly Irish" species. There is an example in the Dublin Museum—formerly in the collection of Trinity College—marked as having been taken in Ireland. This was possibly taken by Tardy, but the species requires confirmation as native.]

Acilius sulcatus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster; has also been found in the counties of Mayo, Roscommon, Dublin, Wicklow, Carlow, Wexford, and Clare.

The variety *scoticus*, Curt., is included in a list of species taken at Carrickfergus by Mr. J. J. Walker.

A. fasciatus, De G.

ULSTER.

Armagh ('87 J. 1; Loughgall, '96 J. 1).

Rare. The Armagh specimens were taken in a flax-hole, and those at Loughgall in a drain in the Manor grounds.

GYRINIDÆ.**Gyrinus minutus, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Ardara), Antrim, Down, Armagh, Fermanagh, Roscommon, Galway, Dublin, Wexford, Kerry (Killarney, Kenmare, &c.).

Local; affects boggy places.

G. urinator, Ill.

MUNSTER.

Kerry (River Flesk near Killarney, '47 W. 1).

Inserted on the strength of the "*G. lineatus*" of this reference.

G. natator, Scop.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

G. elongatus, Aubé.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Mayo, Galway, Dublin, Cork, Kerry.

Not so common as the preceding; extremely variable.

G. bicolor, Payk.

CONNAUGHT. MUNSTER.

Sligo (Ballysodare, Ht.).—Roscommon (Lough Ree, '98 Ht. 1).—

Cork (Blarney Lake, '55 H. 1).—Kerry (Glenbegh, Fg. MS.; Lakes between Killorglin and Glen Caragh, '55 Hn. 2, coll. Fg.).

Rare, though possibly overlooked in other localities. The records, Coolmore ('94 J. Ht. Cr.), and Armagh ('87 J. 1), should have referred to *G. elongatus*, Aubé.

***G. marinus*, Gyll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Apparently common in Ulster, and reported from the counties of Sligo, Westmeath, Dublin, Wexford, Waterford, Cork, and Kerry.

***G. opacus*, Sahl.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Armagh ('00 J. 2).—Sligo (Ballysodare, Ht.).—Galway (L. Derg, Ht.).—Westmeath (Mullingar, Ht.).—Dublin (Royal Canal, '00 Ht. 3).—Carlow (Borris, '95 Ht. 8).—Cork (Queenstown, '95 Wr.).

The record, Adrigole ('94 J. Ht. Cr.), is to be referred to *G. natator*, Scop.

***Orectochilus villosus*, Müll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Portsalon, coll. Wl.).—Armagh ('92 J. 4; Lough Neagh, '89 J. 1).—Fermanagh (Belleisle, '98 Pr.).—Galway (Lough Corrib, '95 Ht. 6; Clonbrock, '96 Ht. 2).—Westmeath (Lough Ree, '00 Ht. 1).—Dublin (North Bull, Fg. MS.; Loughlinstown, '53 Hn.).—Kilkenny (R. Nore, Ht.).—Clare and Limerick (lake shores, Ht.; Lahinch, Gr.).—Waterford (Cappoquin, &c., Ht.).—Cork ('55 H. 1; Fermoy, '95 Ht. 1).—Kerry (Killarney and Smerwick, '55 Hn. 2).

There is a specimen in the collection of the Belfast Nat. Hist. and Phil. Society with the following label:—"Found in the shell of *Limnius pereger* at Bangor, 2 June, 1834." In the reference ('38 Pn.) is the following interesting notice of this capture:—"It was my good fortune, on one occasion, to observe an individual of a different species in an unusual situation—the inhabitant of a freshwater shell (*Limneus pereger*). When the shell was taken out of the pool, its mouth was filled with what appeared to be a mass of clay, but proved to be a fragment of some aquatic plant of suitable length, the space between it and the margins of the aperture being filled with slime. The interior of this mass was lined with a soft whitish silky substance which extended to the edge of the aperture. The "hollow-wreathed chamber" of the shell was occupied by a living individual of *Gyrinus*

villosus." Mr. Patterson suggests what seems most probable, that the beetle had utilised the shell for the purpose of pupating. *Orectochilus villosus* is nocturnal in its habits, but may be found by searching under stones, in the water, at the edges of lakes and rivers.

HYDROPHILIDÆ.

[*Hydrophilus piceus*, L.—The only evidence of the occurrence of this conspicuous species in Ireland is a note in Mr. Haliday's MS. list "Glassnevin, Dr. Coulter, *sed. qy.*" Probably an introduction, as if native it would certainly have been noticed.]

Hydrobius fuscipes, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

H. oblongus, Herbst.

MUNSTER.

Kerry ("Lakes of Killarney," '32 St.).

Recorded as having been taken by Dr. Leach. There is an Irish example in the Haliday collection.

Paracymus nigrosæneus, Sahl.

CONNAUGHT. MUNSTER.

Galway (Erriff River near Leenane, '98 Ht. 4).—Kerry (Kenmare, '98 Ht. 4).

Rare; in flood refuse.

Anacæna globulus, Payk.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

A. limbata, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Armagh, Fermanagh, Roscommon, Dublin, Wexford, Waterford, Kerry.

Widespread; but rarer than the preceding.

Philhydrus testaceus, F.

ULSTER. CONNAUGHT. LEINSTER.

Armagh ('88 J. 2).—Roscommon (Lough Ree, '98 Ht. 1).—Wexford (Enniscorthy, Ht.).

***P. maritimus*, Thoms.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (People's Park, '95 Ht. 4).—Galway (Inishmore, '95 Ht. 6).—Dublin (south, C.).—Clare (Lahinch, coll. Gr.).—Waterford (Tramore, Ht.).

Local; in pools near the coast. The records, Armagh ('87 J. 2; '91 J. 8), should refer to the preceding species.

***P. nigricans*, Zett.**

ULSTER. MUNSTER.

Armagh (Clonmacate, '00 J. 2; Lough Neagh, J.).—Tipperary (Nenagh, Sp.).—Kerry (Kenmare, Ht.).

Rare; in boggy places. The record, Blackrock ('91 C.), is to be deleted.

***P. melanocephalus*, Ol.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. minutus*, F.**

MUNSTER.

Kerry (bog pools between Kenmare and Killarney, April, 1899, Ht.).

***P. coarctatus*, Gredl.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Armagh, Down, Louth, Wexford, Limerick.

***Enochrus bicolor*, Gyll.**

ULSTER. LEINSTER.

Down (Loughbrickland, '96 J. 2).—Dublin (Raheny Ponds, '94 Ht. 3).

Rare.

***Laccobius sinuatus*, Mots.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal, Antrim, Down, Armagh, Sligo, Roscommon, Louth, Dublin, Carlow, Wexford.

Probably this, and the three following species are much commoner than the records indicate, as they are liable to be overlooked by collectors.

***L. alutaceus*, Thoms.**

ULSTER. LEINSTER.

Donegal, Antrim, Down, Armagh, Fermanagh, Louth, Dublin.

***L. minutus*, L.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Louth, Fermanagh, Dublin, Kerry.

***L. bipunctatus*, F.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal, Antrim, Down, Armagh, Sligo, Dublin, Carlow.

***Berosus luridus*, L.**

CONNAUGHT.

Roscommon (Mount Talbot, '98 Ht. 1).

Common in drains and pools on bog land, June, 1897.

***Limnebius truncatellus*, Thoms.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***L. papposus*, Muls.**

ULSTER. LEINSTER.

Donegal, Down, Armagh, Dublin.

There are few records of this species; it is probably confused with the preceding.

***L. nitidus*, Marsh.**

ULSTER. LEINSTER. MUNSTER.

Antrim, Down, Armagh, Louth, Dublin, Waterford.

Mr. C. W. Buckle has taken it in wet moss on rocks in mountain streams near Belfast. The "*L. picinus*" of Haliday's list is probably the present species, not *picinus*, Marsh (*vide* Waterhouse Cat.).***Chaetarthria seminulum*, Herbst.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Derry, Armagh, Sligo, Galway, Louth, Westmeath, Dublin, Carlow, Tipperary.

Frequent.

Helophorus rugosus, Ol.

ULSTER. LEINSTER.

Donegal (Buncrana, '00 B.).—Derry (Magilligan, '00 B.).—Antrim (Portballintrae, '94 T.; Portrush, J.).—Louth (Termonfeckin strand, '00 Ht. 3, coll. C.).

Occurs very locally on the sea coast.

H. nubilus, F.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Coolmore, '94 J. Ht. Cr.).—Down (near Belfast, '85 H.).—Armagh ('91 J. 2).—Louth (south, C.).—Dublin ('53 Hn.; south, C.).—Carlow (Borris, '95 Ht. 8).—Waterford ('78 P.).

H. intermedius, Muls.

ULSTER.

Derry (Culmore, '00 B.).

In a marsh; not common.

H. aquaticus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. The variety *aqualis*, Thoms., occurs.

H. dorsalis, Marsh.

ULSTER. LEINSTER.

Down (near Belfast, '85 H.).—Dublin ("In the Dodder," '56 Hn. 1 & 2).

Not now in the Haliday collection; Hogan records it with a query.

H. æneipennis, Thoms.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, and very variable. The varieties *planicollis*, Thoms., and *strigifrons*, Thoms., are recorded as having been taken in Ireland ('76 Bl.).

H. Mulsanti, Rye.

LEINSTER.

Dublin (Portmarnock, '00 Ht. 3).

A single specimen occurred under mud in a salt marsh, May, 1895.

H. brevicollis, Thoms.

MUNSTER.

Kerry (Killarney, '47 W. 1; '76 Bl.).

The record, Borris ('95 Ht. 8), should refer to *H. brevipalpis*, Bedel.**H. brevipalpis**, Bedel.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

COMMON.

H. arvernicus, Muls.

ULSTER.

Derry (River Faughan, '00 B.).

The record, Armagh ('97 J. 2), should refer to *H. ensipennis*, Thoms.**Hydrochus elongatus**, Schall.

ULSTER. MUNSTER.

Down (Lagan Canal near Moira, B.).—Armagh ('88 J. 2).—Limerick (Lough Gur, Ht.).—Waterford (Dunmore, Wr.).

H. angustatus, Germ.

MUNSTER.

Waterford (Dunmore, Wr.).

Henicocerus exsculptus, Germ.

ULSTER. LEINSTER. MUNSTER.

Derry (Foyle dist., in the River Faughan, '00 B.).—Down (Holywood, H. MS.).—Dublin (Loughlinstown brook, H. diary).—Kerry (Killarney, '47 W. 1; Park River, Killarney, Fg. MS.).—Ireland (H. Coll.).

Octhebius Lejolisi, Muls.

MUNSTER.

Wicklow (Greystones, '00 Ht. 3).

Discovered by Mr. G. H. Carpenter in stagnant rock-pools near the coast-guard station, in the beginning of June, 1897. In Great Britain this species is very local, and apparently confined to the south-west—the only records that we have seen are from Devon, Cornwall, and the Scilly Isles. Abroad it has been recorded from the French coast and the Channel Islands.

***O. margipallens*, Latr.**

MUNSTER.

Kerry (near Kenmare, Ht.).

Taken in a bog-pool, April, 1899.

***O. marinus*, Payk.**

ULSTER. LEINSTER. MUNSTER.

Down (Holywood Warren, H. diary).—Dublin (Portmarnock, '00 Ht. 3; Shankill, C.).—Waterford (Tramore, Ht.).

***O. pygmaeus*, F.**

ULSTER. CONNAUGHT. MUNSTER.

Armagh ('88 J. 2).—Sligo (Ballysodare, Ht.).—Galway (Clonbrock, Ht.).—Kerry (River Flesk, Killarney, '47 W. 1).

***O. bicolon*, Germ.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Carnmoney, B.).—Armagh ('87 J. 2).—Sligo (Enniscrone, J.).—Mayo (Achill, '98 Ht. 2).—Dublin (North Bull, '00, Ht. 3; mountain quarries and Sandyford C.).—Wexford (Rosslare, Ht.).—Kerry (Castlemaine River, '55 Hn. 2).

***O. rufimarginatus*, Steph.**

ULSTER. LEINSTER. MUNSTER.

Armagh ('92 J. 2).—Wexford (Enniscorthy, Ht.).—Kerry (Castlemaine River, '55, H. 2).

Rare.

***O. auriculatus*, Rey.**

LEINSTER.

Meath (Laytown, '00, Ht. 3).—Dublin (North Bull, '00 Ht. 3).

Very local in salt marshes. At the North Bull it occurred under mud, where there had been shallow pools of salt water.

***O. punctatus*, Steph.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (shore of Belfast Bay, '39 Curtis).—Sligo (Enniscrone, J.).—Louth (Clogher, C.).—Dublin (Portmarnock, '53 Hn.).—Kerry (Castlemaine River, '55 H. 2).

Salt marshes, local.

***Hydræna testacea*, Curt.**

LEINSTER.

Kilkenny (Thomastown, Ht.).

Found on the leaves of *Nymphæa* in the River Nore.***H. riparia*, Kug.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***H. nigrita*, Germ.**

ULSTER. MUNSTER.

Antrim (Belfast dist., Lagan Canal, B.).—Armagh ('87 J. 2).—Waterford ('78 P.).

***H. angustata*, Sturm.**

ULSTER. CONNAUGHT. MUNSTER.

Armagh ('92 J. 1).—Roscommon (Lough Ree, '98 Ht. 1).—Tipperary (near Borrisoleigh, Sp.).—Waterford (Dunmore, Wr.).

***H. gracilis*, Germ.**

ULSTER. LEINSTER.

Derry (River Faughan, '00 B.).—Wicklow (Avonmore, H. coll.).—Kilkenny (River Nore, near Thomastown, Ht.).

***H. atricapilla*, Wat.**

ULSTER. MUNSTER.

Derry (River Faughan, 1900 B.).—Armagh ('90 J. 2).—Cork (Queenstown, Wr.).

Occurs in company with the following species; in weed growing on stones in streams, and in wet moss.

***H. pulchella*, Germ.**

ULSTER. LEINSTER.

Derry (River Faughan, '00 B.).—Antrim and Down (Lagan Canal, B.; Lough Neagh, H. coll.).—Armagh ('00 J. 2).—Kilkenny (Thomastown, on *Nymphæa* in the River Nore, Ht.).***Cyclonotum orbiculare*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Armagh, Fermanagh, Sligo, Galway, Louth, Dublin,

Wicklow, Kilkenny, Wexford, Clare, Limerick, Waterford, Cork, Kerry (Valentia, &c.).

Common in suitable localities.

Sphæridium scarabæoides, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

S. bipustulatum, F.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Antrim and Down (Cushendun, '00 J. 2; Lagan Canal, B.).—Armagh ('92 J. 4).—Dublin (Carrickmines, C.).

Not common. The variety *marginatum* F. has been recorded from Down (Holywood, '92 Pt. and Dn.; Strandtown, '00 J. 2). Armagh ('00 J. 2). Dublin ('54 Hn.). Queen's County ('00 Bn.).

Cercyon littoralis, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. A very marked colour-variety of this species—with yellow elytra and a black spot on the posterior third close to the suture (var. *binotatum*, Steph.)—occurs in many localities. We have examples of it from the coasts of Donegal, Sligo (abundant), Mayo (Achill), Galway, and Meath (Laytown).

C. depressus, Steph.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Ballycastle, Cs.).—Armagh (Mullinure, '92 J. 4).—Sligo (Enniscrone, J.).—Dublin (Baldoyle, with *littoralis*, Fg. MS., '54 Hn.).—Cork (Glandore, Ht.).—Kerry (Dingle, Ht.; Carragh Creek, '55 Hn. 2).—" *C. depressus* occurs on most of our sea-coasts along with *C. littorale*, but more sparingly, under seaweed drying on the sands. It was but lately that Mr. Haliday had observed its more peculiar habitat to be on open shingly shores, where it might be found abundantly on the *Laminaria* cast up by the sea—unmixed with *C. littorale*" ('55 H. 1).

C. hæmorrhous, Gyll.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.; Buncrana, Wr.).—Antrim (Glengormly Ht. coll. B.).—Armagh ('87 J. 2).—Dublin (Roebuck, '54 Hn.; Ballsbridge, Fg. MS.).

Not common.

C. hæmorrhoidalis. Herbst.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. obsoletus, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Ballycastle shore, T.).—
 Armagh ('00 J. 2).—Galway (Wr.).—Dublin ('54 Hn.).—Waterford
 ('78 P.).

Not common.

C. aquaticus, Muls.

ULSTER. LEINSTER.

Antrim (Cave Hill, '95 Ht. 4).—Armagh (Lowry's Lough, '96 J.
 2).—Wexford (Rosslare sandhills, Ht.).

Rare; in wet moss. The Armagh specimen occurred among stones
 at the lake edge.

C. flavipes, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. lateralis, Marsh.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. melanocephalus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. unipunctatus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. quisquilius, L.

ULSTER. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.; Coolmore, '94 J. Ht. Cr.).—
 Antrim (Ballycastle, Cs.).—Down (near Belfast, '85 H.).—Fermanagh
 (Belleisle, '98 Pr.).—Louth (Greenore, '88 J. 1; south C.).—Dublin
 (Roebuck, '54 Hn.).

C. nigriceps, Marsh.

ULSTER.

Fermanagh (Belleisle, '98 Pr.).

The variety *centrimaculatum*, Sturm, occurs commonly in this
 locality.

***C. pygmaeus*, Ill.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Louth, Dublin, Wicklow, Carlow, Wexford, Waterford, Cork, Kerry.
Common.

***C. terminatus*, Marsh.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Bundoran, '91 J. 1).—Down (near Belfast, '85 H.).—Armagh ('88 J. 2).—Sligo (Enniscrone, J.).—Dublin (local, '00 Ht. 3).
Not common.

***C. analis*, Payk.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Armagh, Fermanagh, Louth, Dublin, Carlow, Cork, Kerry.
Common.

***C. lugubris*, Payk.**

ULSTER. LEINSTER.

Armagh ('87 J. 2; in flood refuse, Sp.).

[*C. granarius*, Er.; *C. minutus*, Muls.—The records in the references ('88 J. 2; '87 J. 2) are to be deleted.]

***Megasternum boletophagum*, Marsh.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Cryptopleurum atomarium*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

STAPHYLINIADÆ.

***Aleochara fuscipes*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*A. lata*, Grav.—The record, Coolmore ('94 J. Ht. Cr.), is to be referred to *A. lanuginosa*, Grav.]

***A. brevipennis*, Grav.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Buncrana, '95 Wr.).—Fermanagh (Belleisle, '98 Pr.).—Roscommon (Mote Park, '98 Ht. 1).—Galway (Wr.; Clonbrock, '96 Ht. 2; Roundstone, Ht.).—Carlow (Borris, '95 Ht. 8).—Clare (Finlough, Ht.).—Wexford (Killurin and Rosslare, Ht.).—Cork (Queenstown and Middletown, '95 Wr.).—Kerry (Dingle, Ht.).

Common in the south and west of Ireland, but of rare occurrence in the east.

***A. tristis*, Grav.**

LEINSTER.

Louth (Carlingford, '88 J. 1).

The specimen from which this record was made cannot be traced.

***A. bipunctata*, Ol.**

ULSTER. CONNAUGHT. MUNSTER.

Antrim (Belfast, '00 J. 2).—Down (Stormount, '92 Pt. and Dn.).—Armagh ('92 J. 4).—Galway (Wr.).—Waterford ('78 P.).

Not common.

***A. cuniculorum*, Kr.**

LEINSTER.

Wexford (Rosslare Sandhills, Sh., coll. Ht.).

The records, Coolmore ('94 J. Ht. Cr.). Armagh ('89 J. 4); Poyntzpass ('97 J. 2), and Lowry's lough ('00 J. 2), should refer to the following species. Distribution—central Europe, and the western parts of the Mediterranean region.

***A. lanuginosa*, Grav.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***A. moesta*, Grav.**

CONNAUGHT.

Mayo (Achill, coll. Ht.).

Taken in April; species determined by Mr. G. C. Champion. The few previous Irish records of this species are to be referred to *A. succicola*, Thoms., which is a much commoner insect throughout Great Britain.

A. succicola, Thoms.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Galway, Louth, Westmeath (Quaker Island, L. Ree), Dublin, Kerry (Valentia).
Common.

A. mœrens, Gyll.

ULSTER.

Armagh ('00 J. 2).

According to Ganglbauer, this species ranges over northern and central Europe, occurring in fungi.

A. nitida, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in the north, has also been found in Sligo, Galway, Louth, Dublin, Carlow, Wexford, and Waterford. The variety *bilineata*, Gyll., is rarer than the type; the following are the only records. Donegal (Coolmore, '95 J. 1).—Louth (Greenore and Bellurgan, '88 J. 1).

A. morion, Grav.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Wexford (Enniscorthy, Rosslare, &c., Ht.).—Clare (Cratloe Hill, Ht.).—Waterford (78 P.; Tramore).

Local. The record, Holywood ('92 J. 5), is to be deleted.

A. grisea, Kr.

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Foyle dist., '00 B.; Coolmore, '94 J. Ht. Cr.).—Down (Craigavad, Dn.).—Mayo (Achill, '98 Ht. 2).—Louth (Greenore, '00 J. 2).—Dublin ('78 P.; Killiney beach, '00 Ht. 3).—Wicklow (Kilcool, '00 Ht. 3).

Local; on the coast among seaweed.

A. algarum, Faur.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Antrim and Down (Belfast dist., B.; Craigavad, '92 Pt. and Dn.).—Sligo (Rosses Point, J.).—Louth (Greenore, '00 J. 2).—Dublin ('78 P.; Skerries, '92 Sp.; Grey-stones, Sp.).—Waterford (Ardmore Head and Ardoginna, '97 C.).

A. obscurella, Er.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B. ; Buncrana, '95 Wr.).—Antrim (Ballycastle, T.).—Down (Newcastle, Ch.).—Sligo (Enniscrone, J.).—Mayo (Achill, '98 Ht. 2).—Galway (Roundstone, Ht. ; Inishmore, '95 Ht. 6).—Longford (Inchcleraun, Lough Ree, '00 Ht. 1).—Dublin (Portmarnock and Malahide, '54 Hn. ; South Bull, Bk.).—Kerry (Great Blasket, '55 Hn. 2).

Sandy places on the coast—it has been found, however, on an islet in Lough Ree.

Microglossa pulla, Gyll.

CONNAUGHT.

Roscommon (Mote Park, '98 Ht. 1).

M. nidicola, Fairm.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B. ; Coolmore, '95 J. 1).—Dublin (Killiney, '78 M. ; Ht.).—Waterford (Lismore, Ht.).

Found abundantly in Sand Martin's nests at Coolmore and Killiney.

Oxypoda lividipennis, Mann.

ULSTER.

Donegal (Foyle dist., '00 B.).

O. vittata, Märk.

ULSTER.

Antrim (Ballyclare, Fauvel, coll. B.).

O. opaca, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Tyrone, Down, Armagh, Fermanagh, Mayo, Galway, Dublin, Kerry.

Common.

O. alternans, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Ballycastle Cs., Belfast, B.).—Fermanagh (Tempo, Ht.).—Galway (Clonbrock, Ht.).—Wicklow (Ovoca and Powerscourt, Ht.).—Waterford (Cappoquin, Ht.).

Local ; fungi in woods.

O. corecunda, Sharp.

LEINSTER.

Dublin (Dodder Bank, H. coll.).

An *Oxypoda* from this locality in the Haliday collection, has been doubtfully referred in the present species by Dr. Sharp.

O. umbrata, Grav.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Armagh ('92 J. 4).—Wicklow (Lugnaquilla, H. coll.).

O. nigrina, Wat.

ULSTER.

Down (Holywood, in moss, '00 J. 2).

Named by Dr. Sharp.

O. longiuscula, Er.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle), Antrim, Down, Armagh, Fermanagh, Galway, Louth, Cork.

Common.

O. rupicola, Rye.

ULSTER.

Down (Slieve Donard, '76 R., coll. Ch.).

Under stones on summit.

O. hæmorrhœa, Mann.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Wexford (Forth Hills, Ht.).

In fungi. The Wexford specimen has been referred to a dark variety by Dr. Sharp.

O. Waterhousei, Rye.

LEINSTER.

Dublin (Dundrum '00 Ht. 3, coll. Bk. ; North Bull, Ht.).

O. brachyptera, Steph.

ULSTER.

Donegal (Foyle dit., '00 B.).

Named by Dr. Sharp.

Ichnoglossa prolixa, Grav.

CONNAUGHT. LEINSTER.

Galway (Clonbrock, Ht., coll. D.).—Dublin (Dundrum, '00 Ht. 3, coll. Bk.).

Rare.

Ocyusa incrassata, Kr.

ULSTER. CONNAUGHT. LEINSTER.

Antrim and Down (Lagan Canal, Ht. coll. B.; Holywood, '00 J. 2).—Armagh ('00 J. 2).—Galway (Wr.).—Dublin (Howth Demesne, '00 Ht. 3).

Specimens taken on Cave Hill, near Belfast, by Mr. C. W. Buckle, have been verified as this species by M. Fauvel. It may be found under moss at all seasons of the year.

O. hibernica, Rye.

ULSTER.

Down (Slieve Donard, '76 R.; '76 Ch.).

A single specimen found under moss on the summit of the mountain, in company with *Oxygaster rupicola*, Rye. The species was described by Mr. E. C. Rye from Mr. Champion's specimen. It is found also in Scotland, and Mr. B. Tomlin has taken it on the top of Snowdon, August, 1901.

Phloeopora reptans, Grav.

Ireland (H. coll.).

There are Irish-taken specimens of this species in the Haliday collection.

Ocalea castanea, Er.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Ballycastle, T.).—Wexford (Slaney bank, by sweeping under conifers, Ht.).

O. latipennis, Sharp.

ULSTER.

Armagh (Newtown Hamilton, '00 J. 2; in moss on high ground. '00 J. 2).

Ilyobates nigricollis, Payl.

ULSTER. CONNAUGHT. LEINSTER.

Antrim (Cave Hill, Ht., coll. B.).—Armagh ('92 J. 4).—Roscommon (banks of the Suck, '98 Ht. 1).—Dublin (Malahide, '54 Hn.).

***Calodera nigrita*, Mann.**

ULSTER.

Armagh (rare—found in marshy places, '00 J. 2).

***C. æthiops*, Grav.**

ULSTER.

Armagh (very rare, '92 J. 4).

***Myrmedonia collaris*, Payk.**

ULSTER. CONNAUGHT.

Donegal (Foyle dist., '00 B.)—Armagh ('89 J. 1).—Fermanagh (Belleisle, '98 Pr.)—Monaghan (Scotstown, '00 J. 2).—Sligo (Enniscrone, J.)—Galway (Wr. ; shore of L. Derg, near Woodford, Ht.).

Rare ; in flood refuse and moss.

***M. limbata*, Payk.**

MUNSTER.

Waterford ('78 P.).

***Astilbus canaliculatus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common ; often in company with ants.

***Callicerus obscurus*, Grav.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.)—Down (Holywood, '39 Curtis ; '85 H.)—Roscommon (Mote Park, '98 Ht.)—Dublin ('54 Hn.)—Clare (Finlough, Ht.)—Waterford (Lismore, Ht.).

Local.

***Alianta incana*, Er.**

ULSTER.

Armagh ('92 J. 4).—Fermanagh (Tempo, Ht., coll. Sch).

In stems of *Typha latifolia*, at Armagh.

***Homalota currax*, Kr.**

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B. ; Coolmore, '95 J. 1).—Antrim (Cave Hill, Ht., coll. B.)—Dublin (Tallaght, '93 C. 1).—Wicklow (Powerscourt, Ch.).

Occurs amongst shingle on river banks.

H. languida, Er.

LEINSTER.

Carlow (Borris, '95 Ht. 8).

In moss and flood refuse on the River Barrow banks, in April.

H. insecta, Thoms.

ULSTER.

Armagh (Loughgilly, in moss, '00 J. 2).

H. pavens, Er.

LEINSTER.

Dublin (Dundrum, '00 Ht. 3 coll. Bk.).

H. cambrica, Woll.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Wicklow (Bray, '91 F. 1, coll. Ch.).

The Donegal specimens were referred to a large dark form of this species by Dr. Sharp.

H. gregaria, Er.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Mayo (Achill), Clare, Carlow, Wexford, Waterford.

Common.

H. fragilis, Kr.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Dublin (Dodder Banks, H. Coll.).—Wicklow (Powerscourt, '91 F. 1, coll. Ch.).

[*H. imbecilla*, Wat.—The record, Armagh ('92 J. 4), is to be deleted.]**H. luteipes, Er.**

ULSTER. LEINSTER.

Armagh (rare, '91 J. 2).—West Meath (Hare Island, Lough Ree, Fauvel, coll. Ht.).

H. luridipennis, Mann.

ULSTER. LEINSTER. MUNSTER.

Antrim and Down (Belfast dist., Ht., coll. B.).—Dublin (hills, '00 Ht. 3).—Kerry (Valentia, '98 Ht. 3).

The record, Armagh ('91 J. 2), should refer to the following species.

H. Gyllenhali, Thoms.

ULSTER. CONNAUGHT.

Armagh (rare, '92 J. 4).—Roscommon (Mote Park, '98 Ht. 1).

H. hygrotopora, Kr.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Armagh ('94 Sp.; Clonmacate, Loughgilly, J.).—Wicklow (Powerscourt, Ch.).

H. elongatula, Grav.

ULSTER. LEINSTER. MUNSTER.

Donegal (Coolmore, '95 J. 1).—Down (Holywood, J.).—Armagh ('88 J. 2; Newtown Hamilton, J.).—Carlow (Borris, '95 Ht. 8).—Limerick and Clare (lake shore, Sh., coll. Ht.).—Cork (Fermoy, '95 Ht. 7).

H. volans, Scrib.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, especially in the west, where it is abundant on lake shores.

H. clavipes, Sharp.

ULSTER.

Down (Slieve Donard, '75 Ch. 2).

H. tibialis, Heer.

ULSTER.

Down (Slieve Donard, '75 Ch. 2).

H. vestita, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common on the coast under stones and seaweed.

H. nitidula, Kr.

ULSTER.

Donegal (Foyle dist., '00 B.).

Mr. Buckle's specimen was referred to this species, with some reserve, by Dr. Sharp. We are informed by Mr. Champion that the record, Slieve Donard ('75 Ch. 2), must be erased.

H. alpestris, Heer. (var. *nitidiuscula*, Sharp).

ULSTER.

Down (Slieve Donard, '91 F. 1., coll. Ch.).

H. oblongiuscula, Sharp.

ULSTER.

Down ('91 F. 1, coll. Ch.).—Armagh ('92 J. 4).

H. vicina, Steph.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

H. pagana, Er.

ULSTER.

Armagh (in moss, '89 J. 4).—Ireland (H. coll.).

H. graminicola, Gyll.

ULSTER. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Fermanagh, Dublin, Carlow, Waterford, Cork, Kerry.

H. halobrectha, Sharp.

ULSTER. CONNAUGHT. MUNSTER.

Derry (Magilligan sands, '00 B.).—Mayo (Achill, '98 Ht. 2).—Kerry (Kenmare, '98 Ht. 4).

Sea-shore, in company with the following species.

H. puncticeps, Thoms.

ULSTER. CONNAUGHT.

Derry (Foyle dist., '00 B.).—Mayo (Achill, '98 Ht. 2).

Through error the Achill specimens were recorded as *H. princeps*: the present species was intended.**H. occulta**, Er.

ULSTER.

Donegal (Foyle dist., '00 B.).

Doubtful "species near *occulta* ?" Dr. Sharp *in lit.***H. fungivora**, Thoms.

CONNAUGHT.

Galway (Clonbrock Ht., coll. D.).

H. monticola, Thoms.

LEINSTER. MUNSTER.

Dublin (The Scalp, '00 Ht. 3).—Waterford ('78 P.).

H. debilis, Er.

ULSTER.

Armagh (in flood refuse, '94 Sp.).

H. fallaciosa, Sharp.

ULSTER.

Donegal (Foyle dist., '00 B.).

A single specimen referred doubtfully to this species by Dr. Sharp.

H. circellaris, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Very common—ranging to Donegal, Achill, and Valentia.

H. elegantula, Bris.

ULSTER. CONNAUGHT.

Armagh ('92 J. 4).—Galway (Wr.).

[*H. asgra*, Heer.—The record, Holywood ('92 J. 1), should refer to *Ocyusa incrassata*, Kr. see ('00 J. 2).]

H. eremita, Rye.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Down (Slieve Donard, '75 Ch. 2).—Armagh (Lowry's Lough and Newtown Hamilton, J.).—Wicklow (Lugnaquilla, H. coll.).

In moss, on high ground.

H. analis, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, a dark variety occurs on mountains.

H. exilis, Er.

CONNAUGHT. LEINSTER. MUNSTER.

Galway (Leenane, coll. Ht., "either var. *exilis* or new to us," Dr. Sharp).—Carlow (Borris, *variety*, '95 Ht. 8).—Kerry (Valentia, Ht., coll. Dp.).

Taken in flood refuse, in spring.

H. hepatica, Er.**ULSTER.**

Donegal (Foyle dist., '00 B.).

"Apparently a large discoloured ♀ of *H. hepatica*." Dr. Sharp *in lit.*

H. azarata, Sharp.**LEINSTER.**

Wexford (Killoughrum Forest, May, coll. Ht.).

A single specimen, queried by Dr. Sharp as the ♀ of this species.

H. aquatica, Thoms.**ULSTER. CONNAUGHT. MUNSTER.**

Armagh ('92 J. 4).—Galway (Leenane, coll. Ht.).—Waterford ('78 P.).

H. xanthoptera, Steph.**ULSTER. MUNSTER.**

Donegal (Foyle dist., '00 B.).—Antrim (Belfast dist., B.).—Armagh ('92 J. 4; Loughgilly, J.).—Waterford (Dromana Forest, Ht.).

[*H. valida*, Kr.—The record, Slieve Donard ('75 Ch. 2), "must be erased." Champion *in lit.*]

H. euryptera, Steph.**ULSTER. CONNAUGHT. MUNSTER.**

Armagh(J.).—Galway (Wr.).—Clare (Glenomeragh, Sh., coll. Ht.).

H. trinotata, Kr.**ULSTER. CONNAUGHT. LEINSTER. MUNSTER.**

Donegal (Foyle dist., '00 B.).—Down (Craigavad, J.).—Armagh ('92 J. 4, Lough Neagh and Loughgilly, J.).—Fermanagh (Belleisle, Pr.).—Galway (Gentian hill, '95 Ht. 6).—Dublin (Santry, Ht.).—Waterford ('78 P.).—Kerry (Great Blasket, '55 Hn. 2).

The Donegal specimens were queried as a variety of this species by Dr. Sharp.

H. xanthopus, Thoms.**ULSTER.**

Antrim (near Antrim, May, coll. B.).

We are indebted to M. Fauvel for the identification of this insect.

***H. triangulum*, Kr.**

ULSTER.

Armagh (in flood refuse, '94 Sp.).

***H. fungicola*, Thoms.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Fermanagh (Belleisle, Pr.).—Galway (Wr.).—Dublin ('78 M.).—
Waterford ('78 P.; Dromana Forest, Ht.).

***H. coriaria*, Kr.**

MUNSTER.

Clare (Glenomeragh, in fungi, Sh., coll. Ht.).

***H. sodalis*, Er.**

ULSTER. LEINSTER.

Derry (Culmore, Fauvel, coll. B.).—Westmeath (Derravarraugh in
fungi, Fauvel, coll. Ht.).

Found in a nest of *Bombus terrestris* in the month of August,
1899, by Mr. C. W. Buckle.

***H. divisa*, Märk.**

MUNSTER.

Waterford ('78 P.).

***H. palustris*, Kies.**

MUNSTER.

Waterford (salt marsh near Tramore, Fauvel, coll. Ht.).

[*H. nigricornis*, Thoms.—The record, Armagh ('92 J. 4), should
refer to *H. vicina*, Steph.]

***H. ravilla*, Er.**

MUNSTER.

Clare (Glenomeragh, Sh., coll. Ht.).—Waterford ('78 P.).

***H. corvina*, Thoms.**

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Armagh ('92 J. 4).—Wicklow
(Ovoca, '00 Ht. 3).

[*H. atomaria*, Kr.—The record, Armagh ('92 J. 4), is to be
deleted.]

H. sericea, Muls.

ULSTER. MUNSTER.

Armagh ('92 J. 4).—Clare (common in fungi, Sh., coll. Ht.)

H. indiscreta, Sharp.

MUNSTER.

Galway (Leenane, coll. Ht.).

A specimen referred doubtfully to this species by Dr. Sharp.

H. atricolor, Sharp.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00, B.; Ardara, J.).—Armagh ('91 J. 2; Newtown Hamilton, J.).—Dublin (North Bull sands, '00 Ht. 3).—Carlow (Borris, '95 Ht. 8).—Wexford (Rosslare sandhills, '00 Ht. 3).

The specimens from the North Bull and Rosslare sandhills are possibly referable to a dark variety of this species (Sharp *in lit.*).

H. nigra, Kr.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Down (Holywood, '92 J. 5; Craigavad, J. coll. Dn.).—Armagh ('92 J. 4).—Galway (Woodford, coll. Ht.).—Meath (Laytown sandhills, '00 Ht. 3).—Dublin (Dundrum, Ch., coll. Bk.).—Clare (Glenomeragh, Sh., coll. Ht.).—Waterford ('78 P.).

H. germana, Sharp.

ULSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Clare (Glenomeragh, Sh., coll. Ht.).

H. cauta, Er.

MUNSTER.

Waterford ('78 P.).

H. villosula, Kr.

CONNAUGHT. LEINSTER. MUNSTER.

Galway (Wr.).—Dublin (Dundrum, '00 Ht. 3, coll. Bk.).—Waterford ('78 P.).

H. atramentaria.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

H. marcida, Er.

ULSTER.

Armagh (rare, J.).

H. longicornis, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Armagh, Galway, Dublin, Carlow, Wexford, Waterford.

H. sordida Marsh.

ULSTER. LEINSTER. MUNSTER.

Donegal, Armagh, Fermanagh, Dublin, Queen's County, Clare, Limerick, Kerry.

Common in moss and fungi.

H. aterrima, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

H. pygmæa, Grav.

ULSTER. LEINSTER.

Armagh (Lowry's Lough, '91 J. 2).—Dublin (Dundrum, Ch., coll. Bk.).

H. muscorum, Bris.

ULSTER. LEINSTER. MUNSTER.

Armagh ('92 J. 4).—Dublin (Dundrum, Ch., coll. Bk.).—Waterford ('78 P.).

H. pilosiventris, Thoms.

ULSTER. LEINSTER.

Armagh (in moss, J.).—Carlow (Borris, variety, 95 Ht. 8).

H. laticollis, Steph.

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Ballyclare, B.).—Armagh ('92 J. 4).—Galway (Wr.).—Dublin (Dundrum, Ch., coll. Bk.).

H. montivagans, Woll.

ULSTER.

Donegal (Foyle dist., '00 B.).

Named "*pulchra*, Kr.," synonym for present species by Dr. Sharp.

H. orbata, Er.

ULSTER. MUNSTER.

Down (Newcastle, '91 F.).—Kerry (Valentia, '98 Ht. 3).

H. fungi, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

The commonest species of the genus. The variety *clientula*, Er., has been taken in the Foyle district ('00 B.), near Armagh ('92 J. 4), on Achill Island (Ht.), and Tramore Sands (Ht.). The var. *dubia* at Leenane and Armagh.

Gnypeta labilis, Er.

ULSTER. MUNSTER.

Donegal (Foyle dist., '00 B. ; Coolmore, '95 J. 1).—Limerick (Lough Gur, Ht.).—Waterford (Tramore, Ht.).

Locally common.

Tachyusa constricta, Er.

ULSTER.

Derry (Foyle dist., '00 B.).

"On sandy deposit on borders of River Faughan ; plentiful where it occurs, but very local."

T. flavitarsis, Sahl.

ULSTER.

Derry (Foyle dist., '00 B.).

"*Ischnopoda flavitarsis*, var. ?." Dr. Sharp, *in lit.* A leaden-coloured variety without a trace of the usual bluish reflection.

[*T. umbratica*, Er.—The record, Armagh ('92 J. 4), should refer to the following species.]

T. atra, Grav.

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Coolmore, '94 J. Ht. Cr.).—Derry (Foyle dist., '00 B.).—Antrim (Lough Neagh, H. MS.).—Down (Moirra, B.).—Armagh ('92 J. 4 ; Poyntzpass, '97 J. 2).—Fermanagh ('98 Pr.).—Galway (Woodford, Ht.).—Dublin (Dodder banks, '54 Hn. ; Templeogue, Ht.).

. "Sandy shores and marshes" (H.).

***Xenusa uvida*, Er.**

LEINSTER.

Wicklow (Greystones, '00 Ht. 3).

Taken in rock-pools by Mr. G. H. Carpenter. Found under seaweed on the coasts of western Europe, and in the Mediterranean region.

***X. sulcata*, Kies.**

CONNAUGHT. MUNSTER.

Mayo (Achill, '98 Ht. 2).—Kerry (Kenmare, '98 Ht. 4).

Under seaweed and refuse on the coast. Continental range very similar to that of the preceding species.

***Falagria sulcata*, Payk.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.)—Roscommon (Mote Park, '98 Ht. 1).—Dublin ('54 Hn.).—Kerry (Dingle, Ht.).

***F. thoracica*, Curt.**

ULSTER. LEINSTER. MUNSTER.

Derry (Magilligan sands, Ht., coll. B.).—Antrim (Ballycastle, T.).—Wicklow (Bray, '91 F. 1 ; Ovoca, H. coll.).—Queen's County (Maryborough, under stones with ants, Fg. MS.).—Cork (Charleville, H. MS. ; Roscarbery, '95 C. 1).

Rare. On the Continent it has been found in company with *Myrmica rubra*.

***F. obscura*, Grav.**

ULSTER. CONNAUGHT. MUNSTER. LEINSTER.

Common.

***Antalia impressa*, Ol.**

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Armagh (J.).—Fermanagh (Belleisle, '98 Pr.).—Dublin ('54 Hn.).—Queen's County (Maryboro', Sp.).—Wexford (Forth hills, Ht.).

In fungi ; common where it occurs.

***A. rivularis*, Grav.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim, Down, Armagh, Galway, Dublin, Wicklow, Kilkenny, Waterford, Cork.

Common in the south-east.

***Encephalus complicans*, Westw.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Down (near Belfast, '85 H.).—Armagh ('90 J. 1; Poyntzpass, '96 J. 2).—Galway (Wr.).—Dublin (Portmarnock, '54 Hn.).—Wexford (Slaney estuary, Ht.).

Not common; in moss, flood refuse, and in nests of *Myrmica*.

***Gyrophæna affinis*, Mann.**

CONNAUGHT.

Galway (Clonbrock, in fungi on trees, '96 Ht. 2).

***G. gentilis*, Er.**

ULSTER.

Antrim (Ballycastle, in fungi, coll. Cs.).

Obtained commonly in woods near Ballycastle by Dr. G. W. Chaster.

***G. minima*, Er.**

ULSTER. CONNAUGHT.

Antrim (Ballycastle, Ht., coll. Cs.).—Sligo (Glencar, Ch., coll. Cs.).
In moss and fungi.

***G. lævipennis*, Kr.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Ballycastle, Cs.).—Armagh ('92 J. 4).—Fermanagh (Belleisle, '98 Pr.).—Galway (Clonbrock, Ht.).—Longford (Priest's Island, Lough Ree, '00 Ht. 1).—Wicklow (Ovoca, '00 Ht. 3).—Clare (south Ht.).—Waterford (Dromana Forest, Ht.).

Locally common in fungi.

***Leptusa analis*, Gyll.**

ULSTER.

Antrim (Murlough Bay, Ht., coll. Cs.).

A single specimen taken under bark by Dr. G. W. Chaster in September, 1901. Distribution—northern and central Europe, very rare in England, frequent in the Highlands under fir-bark.

***L. fumida*, Er.**

ULSTER. LEINSTER.

Antrim and Down (Belfast dist., Ht., coll. B.).—Armagh (J.).—Dublin (Howth, '00 Ht. 3).—Carlow (Borris, '95 Ht. 8).

Frequent under moss.

***Bolitochara obliqua*, Er.**

ULSTER.

Donegal (Kilderry, '00 B.).—Antrim and Down (Murlough, Cs.; Belfast dist., B.).—Armagh (J.).—Fermanagh (Belleisle, '98 Pr.).

Found commonly under the loose bark of fir trees.

***Phytosus spinifer*, Curt.**

ULSTER. LEINSTER.

Down (Newcastle, '75 Ch. 2).—Meath (coast, '00 Ht. 3).—Dublin (Portrane sands, '54 Hn.).

On the coast of Meath it occurred in decaying starfish in company with *P. balticus*, the latter in abundance. Distribution—coasts of central Europe and the west Mediterranean region, and in the Canary Islands.

***P. balticus*, Kr.**

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Longford (Inchcleraun, Lough Ree, '00 Ht. 1, coll. C.).—Meath (coast, '99 Ch. 1; Ht. 3).

Local. The occurrence of this coast species on an islet in one of the central lakes seems noteworthy; with it were found *Allochara obscurella* and *Sitones griseus*, species usually inhabiting sandy places on the sea coast. Distribution—coasts of western Europe as far north as Scandinavia.

***Diglotta mersa*, Hal.**

ULSTER. LEINSTER. MUNSTER.

Down (Strangford Lough and Dundrum Bay, H. MS.).—Dublin (Portrane sands, '39 H.; Baldoyle, '52 Hn.; North Bull, H. coll.).—Waterford (Tramore, Fg. MS.; Back Strand, Ht.).—Kerry (Ferriter's Cove and shore at Carragh Creek, '55 Hn. 2).—Irish coast ('37 H.).

Local. This interesting species—first described from the Irish coast by Haliday—occurs between tide-marks on the coasts of England, Wales, Scotland (south), Holland, northern and western France. Ganglbauer remarks that it is probably to be found on the German coast.

***D. sinuaticollis*, Muls. & Ray.**

D. submarina, Fairm.—“Sent from Ireland by Mr. Haliday to M. Javet” ('91 F. 1; see also '83 F. 2). There is a small form of it in Mr. Mason's collection, probably found by Haliday in Ireland ('99 Ch.).

Evidently a rarer species than the preceding, though it may possibly be overlooked in many localities. It has been recorded from a few places in the south of England, Lancashire, and the coast of France.

***Hygromoma dimidiata*, Grav.**

ULSTER.

Armagh (Lowry's Lough, '96 J. 2).—"Ireland H." (Fig. MS.).
Obtained on the edge of the lake, running on stems of *Carex*.

***Oligota inflata*, Mann.**

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Down (Mourne mountains, H. coll.).—Dublin ('54 Hn.; bed of the Dodder, '00 Ht. 3).—Waterford ('78 P.).—Kerry (Kenmare, Ch., coll. Cs.).

***O. punctulata*, Heer.**

LEINSTER. MUNSTER.

Dublin (bed of the Dodder, '00 Ht. 3).—Wexford (Rinniscorthy and Ardavan, Ht.).—Kerry (Valentia, '98 Ht. 3).

***Myllaena dubia*, Grav.**

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Armagh ('90 J. 1).—Carlow (Borris, '95 Ht. 8).

***M. intermedia*, Er.**

ULSTER. MUNSTER.

Armagh ('90 J. 1).—Clare (marsh on Cratloe Hill, Sh., coll. Ht.).

***M. minuta*, Grav.**

ULSTER. CONNAUGHT. MUNSTER.

Armagh ('92 J. 4).—Sligo (Ballysodare, Ht.).—Clare (Glennomeragh, Sh., coll. Ht.).

***M. brevicornis*, Matth.**

ULSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Carr's Glen, under gravel in river bed, Ht., coll. B.).—Armagh ('90 J. 1).—Kerry (Sybil Head, '55 Hn. 2).—Ireland (H. coll.).

Rare in moss; recorded by Hogan as *M. gracilis*.

***Gymnusa brevicollis*, Payk.**

ULSTER.

Derry (Foyle dist., '00 B.).—Armagh (Mullinure, '94 J. 1).

In flood refuse and moss. Mr. Buckle found it plentifully at Culmore, in a marsh under rushes. Haliday states ('55 H. 1) that the Holywood record ('41 H. 1) should have referred to the following species. Abroad this species is very widely distributed over northern and central Europe, Siberia, and in North America.

***G. variegata*, Kies.**

ULSTER.

Down (Holywood, '55 H. 1).

"*Gymnusa brevicollis*, given as such in the Entomologist (1841), should be *G. variegata*, Kiesenwetter, as Dr. Schaum subsequently showed." Unfortunately Haliday's specimens cannot be traced.

***Hypocyrtus longicornis*, Payk.**

MUNSTER.

Waterford ('78 P.).—Ireland (H. coll.).

***H. læviusculus*, Mann.**

ULSTER. LEINSTER. MUNSTER.

Antrim (Ballycastle, Ch., coll. T.).—Dublin (Portmarnock, on the bent grass, '54 Hn.; North Bull, Ht.).—Carlow (Borris, '95 Ht. 8).—Cork (Kanturk, '47 W. 1).

***H. ovulum*, Heer.**

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Armagh ('88 J. 5; Poyntzpass, '97 J. 2).—Dublin (Dundrum, Ch., coll. Bk.).

***H. seminulum*, Er.**

ULSTER.

Donegal (Foyle dist., '00 B.).—Ireland (H. coll.).

***Conosoma pubescens*, Grav.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle), Derry, Antrim (Ballycastle), Down, Armagh, Dublin (Portmarnock and Killiney), Wicklow (Avoca), Cork (Glandore), Kerry (Ballybunion and Torc Wood).

[*C. pedicularium*, Grav. Requires confirmation as an Irish species. The record in Hogan's Dublin list ('54 Hn.) should probably refer to the following species.]

C. lividum, Er.

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Cavan, Dublin, Waterford, Cork, Kerry.

Common.

Tachyporus obtusus, L.

ULSTER. CONNAUGHT. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim and Down (Belfast dist., B.).—Armagh ('92 J. 4; Portadown, '88 J. 2).—Fermanagh (Tempo. '97 L. 1).—Cavan (Ballyhaise, '94 J. Ht. Cr.).—Sligo (Ballymote, Ht.).—Dublin (Santry, &c., Ht.).

Not common.

Var. *nitidicollis*, Steph.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, and to a great extent takes the place of the type.

T. formosus, Matth.

ULSTER. CONNAUGHT. MUNSTER.

Down (near Belfast, '85 H.).—Galway (Wr. in lit.).—Cork (Kanturk and Bantry Bay, '47 W. 1).

These records require confirmation. The *T. abdominalis* of Haliday's list may have been intended for this species; while Mr. Wollaston's records stand as *T. subtestaceus*, a name queried in Waterhouse's Catalogue as a synonym for *T. formosus*, Matth.

T. solutus, Er.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

T. pallidus, Sharp.

CONNAUGHT. MUNSTER.

Roscommon (Mote Park, '98 Ht. 1).—Waterford (Tramore, Ht.).

***T. chrysomelinus*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. A large pallid variety, closely resembling *T. solutus*, occurs in Ireland, especially in the north of Donegal. Dr. Sharp informs us that a similar variety is common in Scotland.

***T. humerosus*, Er.**

ULSTER. LEINSTER.

Donegal, Derry, Antrim, Armagh, Fermanagh, Cavan, Dublin.

***T. tersus*, Er.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Cavan (Ballyhaise, '94 J. Ht. Cr.).—Sligo (Ballymote, Ht.).—Dublin (Dodder banks, Ht.).—Limerick (Ht.).—Kerry (Loo Bridge, Cs. ; Dingle, Ht.).

[*T. ruficollis*, Grav.—Recorded from Ireland by Wollaston ('55 W.). Dr. Sharp examined these specimens and reported that they were nothing more than *T. obtusus*, var. *nitidicollis* (see '65 R.).]

***T. hypnorum*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. The variety *meridionalis*, Fairm., occurs.

***T. pusillus*, Grav.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Down, Armagh, Fermanagh, Dublin, Waterford, Cork.

Common.

***T. brunneus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*T. transversalis*.—The records, Armagh ('91 J. 2 ; '92 J. 4), are to be deleted.]

***Lamprinus saginatus*, Grav.**

ULSTER. LEINSTER.

Armagh (J.).—Dublin (Tallaght, '00 Ht. 3).

Found in moss from the R. Dodder banks, April.

Cilea silphoides, L.

ULSTER. LEINSTER.

Down (near Belfast, '85 H.).—Armagh (J.).—Fermanagh (Belleisle, '98 Pr.).—Dublin ('54 Hn. ; Santry, Ht.).

Tachinus humeralis, Grav.

LEINSTER.

Queen's County (Maryborough, Sp.).

[*T. flavipes*, F.—The record, Borris ('95 Ht. 8), should read *T. rufipes*, L.]

T. pallipes, Grav.

ULSTER.

Donegal and Derry (Foyle dist., '00 B.).

"Occasionally in moss, but attracted in numbers by carrion in woods." Distribution northern—Scotland, England (Northumberland dist.). Northern and central Europe, and in North America.

T. rufipes, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

T. subterraneus, L.

ULSTER. CONNAUGHT. LEINSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Galway, Dublin.

The variety *bicolor*, Grav., is recorded from Cultra wood in the county of Down ('92 Pt. and Dn.).

T. marginellus, F.

ULSTER. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Tyrone, Armagh, Cavan, Louth, Dublin, Wicklow, Wexford, Limerick, Kerry.

Common.

T. laticollis, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Roscommon, Carlow, Wicklow, Limerick.

Common.

T. elongatus, Gyll.

ULSTER. LEINSTER.

Donegal (Buncrana sands, '00 B.).—Dublin (Chapelized Glen, '54 Hn.).—Skerries ('93 C. 2).—Wicklow (Powerscourt and Doney Mountain, '97 Bk.).

Rare—taken at Chapelized by Mr. A. Furlong in June, 1850.

Megacronus cingulatus, Mann.

ULSTER. CONNAUGHT. MUNSTER.

Donegal (Foyle dist., '00 B.).—Fermanagh (Belleisle, common, '98 Pr.).—Roscommon (banks of the R. Suck, '98 Ht. 1).—Waterford (Rathkurby, '91 F., not mentioned in Dr. Power's '78 list).—Cork (Queenstown, '95 Wr.).

Under stones, and in moss. The records, Armagh ('88 J. 5; '89 J. 1), are to be referred to the following species.

M. analis, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Down, Armagh, Fermanagh, Galway, (Clonbrock), Dublin (rare), Clare (Lahinch), Limerick (Fg. MS.), Kerry (north).

Commoner than the preceding.

Bryoporus cernuus, Grav.

Megacronus cernuus v. *merdarius*, H. MS.

ULSTER.

Down (near Belfast, '85 H.).

Recorded as *Bolitobius cernuus* in this reference, but listed as above in Mr. Haliday's MS. Irish list. Unfortunately the specimens cannot be traced.

Widely distributed in Europe, but it does not seem to have been met with recently in Great Britain.

Bolitobius lunulatus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in moss and fungi.

B. trinotatus, Er.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle), Antrim, Down, Armagh, Wicklow (Powerscourt and Ovoca), Queen's County, Wexford, Waterford, Cork (Middletown).

Common, often in company with the two following species.

B. exoletus, Er.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Galway, Wicklow, Waterford.

B. pygmaeus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim, Down, Armagh, Fermanagh, Galway, Dublin, Wicklow, Queen's County, Wexford, Waterford, Clare, Limerick.

Common.

Mycetoporus lucidus, Er.

ULSTER.

Armagh (in moss, rare, '91 J. 2).

M. splendens, Marsh.

MUNSTER.

Clare (Lough Derg, Sp.).—Cork (Queenstown, '95 Wr.).

The record, Armagh ('94 J. 1), should read *M. splendidus*, Grav.**M. lepidus, Grav.**

ULSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Clare (Glenomeragh, in fungi, Ht.).

M. longulus, Mann.

ULSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Coolmore '95 J. 1).—Armagh ('88 J. 2).—Clare (Glenomeragh, Ht.).—Kerry (Loo Bridge, Cs.).

In moss and refuse, also among seaweeds.

M. nanus, Er.

ULSTER.

Donegal (Coolmore, '96 J. 1).—Derry (Magilligan sands, '00 B.).—Armagh (in flood refuse, '94 Sp.).

M. angularis, Rey.

ULSTER. LEINSTER. MUNSTER.

Antrim (Cave Hill, B.).—Down (Slieve Donard, H. coll.).—Wicklow (Lugnaquilla, H. coll.).—Clare (Glenomeragh, Ht.).

Local, on hills.

M. clavicornis, Steph.

ULSTER. CONNAUGHT.

Donegal (Foyle dist., '00 B.).—Galway (Wr.).

M. splendidus, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Armagh ('88 J. 5; Loughgilly, J.).—Fermanagh (Pr.).—Galway (Wr.).—Dublin (Dundrum, Bk.).—Kerry (Ballybunion, '98 C.).

Habrocerus capillaricornis, Grav.

ULSTER.

Donegal (Foyle dist., '00 B.).

Taken in March at the base of an oat-rick.

Heterothops binotata, Er.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Down (Greencastle, '96 J. 3).—Holywood, H. coll.).—Louth (Greenore, J.).—Dublin (coast, '00 Ht. 3).

Under seaweed. The record, Armagh ('89 J. 4), is to be deleted.

H. dissimilis, Grav.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Dublin (Portmarnock, '55 H. 1).—Waterford ("Dr. Power has taken it near Waterford," '59 Js.).

Quedius longicornis, Kr.

CONNAUGHT.

Roscommon (Mount Talbot, '98 Ht. 1).

A single specimen of this insect was taken on the banks of the Suck, in the summer of 1897, by the Hon. R. E. Dillon. The species is widespread on the Continent, but it is extremely local in Great Britain, having been recorded from a few isolated localities in the midlands and as far north, at least, as the Solway district.

Q. mesomelinus, Marsh.

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Armagh, Fermanagh, Cavan, Dublin, Wicklow, Clare, Limerick.

Common. Dr. Sharp considered specimens taken by Mr. E.

Porter in the Lough Erne district to be possibly referable to the variety *fageti*, Thoms.

Q. fulgidus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (Holywood, '92, Pt. & Dn.).—Armagh ('92 J. 4).—Mayo (Westport, Wr.).—Louth (Carlingford, J.).—Waterford ('78 P.).—Kerry (Cloonee, Cs.).

Not common.

Q. puncticollis, Thoms.

ULSTER. CONNAUGHT. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Ballycastle dist., Cs. & T.).—Fermanagh (Marble Arch. Cs.).—Mayo (Westport, Wr.).—Galway (Clonbrock, D.).—Dublin (Skerries, Bk.).—Wicklow (Blessington, '00 Ht. 3).

Frequent.

Q. brevicornis, Thoms.

MUNSTER.

Waterford ('78 P.).

Q. cruentus, Ol.

ULSTER.

Antrim (Murlough Bay, Cs.).—Armagh (Loughgilly, '93 Jn.).

The specimens from both of these localities are referable to the variety *virens*, Rottbg.

Q. cinctus, Payk.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster; has also been taken in the counties of Galway, Dublin, Queen's County, Cork, and Kerry.

Q. fuliginosus, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

Q. tristis, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

Q. molochinus, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Q. picipes*, Mann.**

ULSTER. CONNAUGHT. LEINSTER.

Antrim (Ballycastle dist., Cs. and T.; Cave Hill, Ht., coll. B.).—Sligo (Glencar, Cs.).—Dublin (Mount Pelier, '94 Ht. 3).

Not common; taken under moss in autumn.

***Q. fumatus*, Steph.**

ULSTER. LEINSTER. MUNSTER.

Antrim (Colin Glen, Ht., coll. Wl.).—Armagh ('90 J. 1).—Fermanagh (Tempo, Ht., coll. Sch.).—Wicklow (Powerscourt, '00 Ht. 3).—Cork (Queenstown, '95 Wr.).—Kerry (Fg. coll., one specimen marked "Sands, Kerry").

Local, under moss and dead leaves.

***Q. maurorufus*, Grav.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Foyle dist., '00 B.).—Antrim (White Park, T.).—Armagh ('92 J. 2).—Fermanagh (Marble Arch, Cs.).—Sligo (Glencar, Cs.).—Dublin (Raheny, '95 Ht. 3; Tolka Valley and Dollymount shore, Ht.).

***Q. umbrinus*, Er.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Ballycastle, Ht., coll. Cs.).—Fermanagh (Marble Arch, Cs.).—Galway (summit of Leenane Mountain, '00 Ht. 3).—Dublin (Templeogue, '00 Ht. 3).—Kerry (Killarney, '91 F. 1).

Rare.

***Q. scintillans*, Grav.**

ULSTER.

Donegal and Derry (Foyle dist., '00 B.).—Armagh (Loughgilly, J.).
Rare, in moss. Mr. C. W. Buckle found this species in carrion.

***Q. auricomus*, Kies.**

ULSTER. CONNAUGHT.

Fermanagh (Marble Arch, Cs.).—Sligo (Glencar, Cs.).

In moss, very local. The record, Armagh ('92 J. 4), should refer to the preceding species. *Q. auricomus* has a wide range in Great Britain (Midlands to the Tay district); and on the Continent it has been recorded from the Pyrenees, France, and western Germany.

Q. rufipes, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Galway, Dublin, Waterford, Kerry.

Q. attenuatus, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster; also in the counties of Galway, Louth, Dublin, Wicklow, Carlow, Limerick, and Clare. This species is evidently common, and like *Q. boops*, it ranges from sea-level to the summits of our highest mountains.

Q. semisneus, Steph.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

Q. boops, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Armagh, Mayo (Slievemore, Ht.), Galway (Leenane, &c.), Louth, Dublin, Wicklow, Carlow, Kerry (Reeks, &c.).

Creophilus maxillosus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Very common in carrion, more plentiful on sea-coast than inland. The variety *ciliaris*, Steph., has been recorded from the following localities: Donegal (Buncrana, '95 Wr.; Coolmore, '94 J. Ht. Cr.).—Antrim (Portballintrae, '91 Dg.).—Fermanagh (Belleisle, '98 Pr.).—Kerry (Ferriter's Cove, '55 Hn. 2; Dingle Bay and Castlemaine sands, Fg. MS.), and it occurs rarely in the Dublin district.

Leistotrophus nebulosus, F.

ULSTER. CONNAUGHT.

Antrim (Cushendun, '89 J. 3).—Down (near Belfast, '85 H.).—Armagh ('96 J. 1; Tanderagee, '96 J. 2).—Fermanagh (Belleisle, '98 Pr.; Tempo, '97 L. 1).—Roscommon (Mount Talbot, '98 Ht. 1).

Rare.

L. murinus, L.

ULSTER. LEINSTER. MUNSTER.

Donegal (Bruckless, '95 J. 1).—Antrim and Down (Belfast dist., '85 H.; Orr).—Armagh (Lowry's Lough, '96 J. 1).—Wexford (Court-

town, '93 C. 4).—Cork (Rosscarbery, '95 C. 1).—Kerry (Ventry sandhills, Ht.; Killarney, '71 S.; Parknasilla and Kenmare coll. Yr.).

Local. The *Staphylinus minimus* of Haliday's Belfast list is due to a misprint; it is *murinus* in his MS.

***Staphylinus pubescens*, De G.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***S. erythropterus*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Fairly common and widely distributed.

***S. cæsareus*, Ceder.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Very common, especially in the west.

***Ocypus olens*, Müll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

This is one of the few beetles which have attracted the attention of the public, and not being a handsome insect, it has received anything but complimentary names, *s.g.* "Devil's Coach Horse," &c. In the north of Ireland it is called the "Coffin Cutter," from an idea that it burrows into graves and eats its way through the coffins. In both perfect and larval stage it will attack earthworms, and a fierce strife has been seen going on between one of these beetles and a big earthworm many times its length.

***O. similis*, F.**

ULSTER. LEINSTER.

Down (near Belfast, H. MS.).—Dublin (local, '54 Hn.).

We have never seen an Irish example of this species. Haliday includes it in the MS. of his Belfast list, and he also gives *Goorius morio*. The Dublin record, however, may be due to some error in synonymy, as the common *Ocypus morio* is entirely overlooked by Hogan—moreover, the name *similis* occurs as a synonym for *O. morio*, Grav. (*vide* Waterhouse's Catalogue).

O. brunnipes, F.

ULSTER. CONNAUGHT.

Antrim (Cave Hill and Colin Glen, coll. B.; near Belfast, '85 H.).
—Galway (Wr.).

Fairly abundant under stones, near the boundary wall of the Shaftesbury Estate at Cave Hill.

O. cupreus, Rossi.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

O. ater, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Mayo (Westport), Galway, Louth, Dublin, Wexford, Cork, Kerry (Puffin Island, Kenmare, &c.).

Widely distributed, and confined to the sea-coast.

O. morio, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

O. compressus, Marsh.

ULSTER. LEINSTER. MUNSTER.

Derry (near Derry, Bk.).—Armagh (Loughgilly, J., coll. Jn.).—Louth (Carlingford, '88 J. 1).—Dublin (Portmarnock-road, Fg. MS., Dundrum, '00 Ht. 3).—Wicklow (Brittas sands, Fg. coll.).—Wexford (Forth hills, Ht.).—Waterford (Dunmore, Wr.; Ardmore, '97 C.).—Cork (Queenstown, Wr.).—Kerry (Puffin Island, Ht., coll. Dp.; Caragh Lake, coll. Yr.).

Local—usually not far from the coast where it has been found under seaweed.

Philonthus splendens, F.

ULSTER. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Fermanagh, Dublin, Waterford, Limerick, Cork.

P. intermedius, Boisd.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Coolmore, '96 J. 1; Rathmullen, Wr.—Down (Holywood and Craigavad, '92 Pt. and Dn.).—Armagh ('92 J. 4; Poyntzpass, '97 J. 1; Newtown Hamilton, J.).—Fermanagh

(Belleisle, '98 Pr.).—Mayo (Achill, '98 Ht. 2).—Roscommon (Mount Talbot, Ht.).—Galway (Roundstone, Ht.).—Dublin ('00 Ht. 3).—Waterford ('78 P.)—Kerry (Waterville, Ch., coll. Yr.; Valentia, Ht.).
Frequent—rather common in the west.

P. laminatus, Creutz.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common—occurs on Achill and Valentia.

P. senens, Rossi.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Galway, Dublin, Cork, Kerry.

P. proximus, Kr.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Fermanagh, Mayo (Achill), Galway, Dublin, Waterford, Kerry (Valentia, &c.).

A curious specimen of this beetle was taken by Dr. Donnan at Holywood. It had three punctures in the dorsal series on one side of its thorax and four in the other, and the whole thorax was very finely and closely punctured instead of being smooth ('92 J. 2).

P. addendus, Sharp.

ULSTER. LEINSTER. MUNSTER.

Donegal, Down, Armagh, Fermanagh, Cavan, Dublin, Wicklow, Carlow, Wexford, Waterford, Kerry.

P. carbonarius, Gyll.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Ballycastle, T.).—Armagh ('92 J. 2; Loughgilly, J.).—Fermanagh (Belleisle, '98 Pr.).—Cavan ('94 J. Ht. Cr.).—Dublin ('00 Ht. 3).

Not common. The old records of *P. tenuicornis*, Rey., are to be referred to the present species ('66 R. 1, 2; '67 R. 2).

P. scutatus, Er.

ULSTER.

Antrim (Ballycastle, T.).

A single specimen found by Mr. Tomlin at this locality in September, 1901.

***P. decorus*, Grav.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Fermanagh, Galway, Roscommon, Dublin, Wicklow, Tipperary.

Common.

***P. politus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. lucens*, Er.**

ULSTER.

Donegal (Foyle dist., '00 B.).—Armagh ('94 Sp.).—Fermanagh (Belleisle, '98 Pr.).—Cavan (Lough Oughter shore, '94 J. Ht. Cr.).

Local, but not uncommon where it is found in flood refuse, moss, and on lake shores. In Great Britain this species is said to be very rare, but ranges from Devonshire to the Forth and Clyde districts. According to Ganglbauer it is widely distributed over Europe, occurring under moss in woods.

***P. varius*, Gyll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. marginatus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. albipes*, Grav.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Bruckless, '95 J. 1).—Fermanagh (Belleisle, '98 Pr.).—Louth (Braganstown Bog, '95 Ht. 7).—Dublin (North Bull, '00 Ht. 3).—Waterford (Tramore, Ht.).

***P. umbratilis*, Grav.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Coolmore, J.).—Antrim (Ballycastle, Cs.; Belfast, B.).—Armagh (Maghera, Lough Neagh, '91 J. 3).—Fermanagh (Belleisle, '98 Pr.).—Dublin ('00 Ht. 3).—Clare (Lough Derg and Finlough, Ht.).—Kerry (Killarney, Ht.).

***P. cephalotes*, Grav.**

ULSTER. LEINSTER. MUNSTER.

Dublin, Derry, Armagh, Fermanagh, Longford (Inchcleraun), Dublin, Clare, Waterford, Kerry (Valentia).

***P. fimetarius*, Grav.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. sordidus*, Grav.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B. ; Coolmore, '95 J. 1).—Antrim (Shane's Castle, Dn.).—Down (Craigavad, Dn.).—Dublin ('00 Ht. 3).—Clare (Ballyvaughan, '95 Ht. 6).—Kerry (Kenmare, Ht., coll. Yr.).

Local. The record, Coney Island ('90 J. 1), should refer to *P. quisquiliarius*, Gyll.

***P. ebeninus*, Grav.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Sligo, Mayo (Achill), Louth, Dublin, Wexford, Waterford, Clare, Kerry.

***P. corvinus*, Er.**

ULSTER.

Monaghan (Scotstown, in moss, rare, J.).

***P. debilis*, Grav.**

ULSTER. LEINSTER.

Fermanagh (Belleisle, '98 Pr.).—Dublin ('00 Ht. 3).

***P. sanguinolentus*, Grav.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. cruentatus*, Gmel.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Ardara, J.).—Antrim (Ballycastle, Cs.).—Down (near Belfast, '85 H.).—Louth (Bellurgan, J.).—Waterford (Ardmore, '97 C.).

***P. longicornis*, Steph.**

ULSTER. LEINSTER.

Donegal (common).—Fermanagh (Belleisle, '98 Pr.).—Meath (Laytown sands, '94 D.N.F.C.).—Dublin ('00 Ht. 3).

***P. varians*, Payk.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. A remarkable variety of this species occurred at Bundoran, which had a puncture short in each of the dorsal series on the

thorax. Dr. Sharp, to whom the specimen was submitted, remarked that he had never seen this variation in any European species before ('92 J. 2).

[*P. agilis*, Grav. The record, Ardara ('92 J. 3), should have referred to *P. longicornis*, Steph.]

P. vernalis, Grav.

ULSTER. MUNSTER.

Donegal (Coolmore, '96 J. 1).—Kerry (Ballybunion, '98 C.).

P. ventralis, Grav.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Armagh ('89 J. 4).—Fermanagh (Belleisle, '98 Pr.).—Wexford (Enniscorthy, Ht.).

P. discoides, Grav.

ULSTER. LEINSTER.

Armagh ('92 J. 4).—Fermanagh (Belleisle, '98 Pr.).—Dublin ('78 M.).

P. quisquiliarius, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Ardara, '92 J. 3; &c.).—Armagh ('93 J. 4; Coney Island, Lough Neagh, J.).—Monaghan (Scotstown, J.).—Sligo (Lough Gill, J.).—Galway (banks of the Corrib, '95 Ht. 6; Clonbrock, '96 Ht. 2).—Wexford (Slaney estuary, Ht.).—Limerick (Lough Gur, Ht.).—Kerry (between Glengariff and Kenmare, Ca.).

Fairly common on banks of streams and lake shores in the north and west of Ireland, but rare in the east. The species is almost of world wide range.

Var. *dimidiatus*, Er.

ULSTER.

Donegal (Foyle dist., '00 B.).—Armagh (Lowry's Lough and Coney Island, Lough Neagh, '89 J. 1).

Under stones near the water's edge, where they are exceedingly active and difficult to catch. In the Haliday collection there are specimens both of the type and variety taken in the Lough Neagh district, probably on the Antrim shore.

***P. splendidulus*, Grav.**

MUNSTER.

Kerry ("Sea weed, Glenbeghy," Fg. MS.).

***P. thermarum*, Aubé.**

ULSTER.

Down ("Holywood, in stack yard," H. coll.).

A single specimen in the Haliday collection labelled as above, and named "*Philonthus mutilatus*, n. sp."

***P. nigrita*, Nord.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 P.).—Armagh ('89 J. 1).—Monaghan (Scotstown, J.).—Galway (Wr.).—Dublin (Raheny, '00 Ht. 3).—Limerick (Fg. MS.).—Kerry (Kenmare, Ht.).

***P. fumarius*, Grav.**

ULSTER. CONNAUGHT.

Armagh (J.).—Fermanagh (Belleisle, '98 Pr.).—Cavan (Lough Oughter, '94 J. Ht. Cr.).—Galway (Wr.).

Lake shores—very local.

***P. micans*, Grav.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Coolmore, '96 J. 1.—Armagh ('89 J. 4; Loughgilly, J., coll. Jn.).—Fermanagh (Belleisle, Pr.).—Galway (Wr.).—Dublin ('00 Ht. 3).—Wicklow (Kilcool, Ht.).

[*P. astutus*, Er.—Canon Fowler writes as follows of this insect—a somewhat doubtful native:—"M. Fauvel kindly sent me a specimen of this insect, which he had found in the collection of M. Javet, ticketed 'Ireland.' As M. Javet collected for some time in Ireland, especially in the neighbourhood of Belfast, and as the insect is by no means an unlikely one to occur in the locality, M. Fauvel thinks that the species is probably British. M. Javet may possibly have made a mistake and more evidence will, perhaps, be required before it is inserted on the British list, but the fact is worth recording as Irish collectors may possibly confirm the capture" ('83 F. 1). Recorded by Ganglbauer as a rare species in central Europe, Caucasus, and Siberia.]

***P. nigrutilus*, Grav.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Tyrone, Armagh, Fermanagh, Cavan, Sligo, Mayo, Roscommon, Galway, Dublin, Carlow, Wexford, Limerick, Waterford, Kerry.

We have carefully compared our series of this and the following species with types named by Dr. Sharp, and find that *P. nigrutilus* is apparently of much more frequent occurrence in Ireland. *P. nigrutilus* may be best recognised through its narrower head, longer elytra, and by the fact that the thorax is slightly narrowed in front, instead of being the same breadth throughout. The legs are usually darker in colour. The species is of world-wide range.

***P. trossulus*, Nord.**

ULSTER. CONNAUGHT.

Donegal, Derry, Antrim, Down, Armagh, Galway.

Distribution—northern Europe, Germany (north), and Bohemia (Ganglbauer).

***P. puella*, Nord.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Foyle dist., '00 B. ; Ardara, '92 J. 3).—Down (near Belfast, '85 H.).—Armagh ('90 J. 1).—Fermanagh (Belleisle, 98 Pr.).—Cavan (Ballyhaise, '94 J. Ht. Cr.).—Galway (Clonbrock, Ht.).—Dublin (hills, '95 Ht. 3.).

Frequent.

The *P. punctus* of Haliday's list ('85 H.) is no doubt the present species (see Waterhouse's Catalogue).

***Cassus fucicola*, Curt.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (Holywood Warren, H. MS.).—Galway (shore at Gentian Hill, '95 Ht. 6).—Louth (Greenore, '88 J. 1).—Dublin (Killiney, '54 Hn; Howth, Sp.; Skerries, '93 Sp.).—Cork (Glandore, Ht.).—Kerry (Ballybunion, '98 C.; Kenmare, '98 Ht. 4; Great Blasket, '55 Hn. 2; Valentia, Ht.).

Locally common under seaweed. This species ranges west in Great Britain, being found on the coasts in the south and west of England, Wales, Isle of Man, and Scotland (Forth district). On the Continent it seems recorded only from the French coast.

C. xantholoma, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. The variety *variolosus*, Sharp, has been found in the following localities :—Louth (Greenore, J.)—Wicklow (Bray, '91 F. 1, coll. Ch.).—Kerry (Great Blasket Island, H. coll.).

C. sericeus, Holme.

ULSTER. LEINSTER.

Down (Strangford Lough, coll. B.).—Dublin (Malahide, '54 Hn.).

Actobius cinerascens, Grav.

ULSTER.

Donegal (Foyle dist., '00 B.).—Armagh ('90 J. 1 ; Lowry's Lough, '91 J. 3).

A. procerulus, Grav.

ULSTER. MUNSTER.

Down (Mourne mountains, H. coll.).—Cork (banks of the Black-water near Fermoy, '95 Ht. 1).

Xantholinus fulgidus, F.

LEINSTER.

Dublin (Dundrum, '00 Ht. 3).

Apparently a scarce species in Ireland, but Mr. F. H. Bullock found it in numbers in this locality.

X. glabratus, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Sligo, Louth, Dublin, Wicklow, Kilkenny, Wexford, Waterford, Cork, Kerry.

X. punctulatus, Payk.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, occurring on Achill and Valentia.

X. ochraceus, Gyll.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B. ; Coolmore, '95 J. 3 ; Bun-crana, '95 Wr.)—Antrim (Ballycastle, Cs.).—Down (near Belfast, '85 H.).—Armagh ('92 J. 4 ; Loughgilly, J.).—Waterford (Tramore, Ht.).—Kerry (Rossbegh, '71 S. ; Dingle and Kenmare, Ht.).

Frequent.

[*X. atratus*, Heer. The records Armagh ('88 J. 2), and Carlingford ('88 J. 1) are to be referred to *X. punctulatus*, Payk.]

***X. tricolor*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Down, Sligo, Galway, Louth, Dublin, Wicklow, Kerry.

Mostly at seaside in decaying seaweeds, but also inland—not common.

***X. cribripennis*, Fauvel.**

ULSTER.

Donegal (Buncrana, '00 B; Bundoran and Coolmore sandhills, River Erne bank near Ballyshannon, '94 J. Ht. Cr.).—Derry (Magiligan sands, '00 B.).

We are indebted to M. Fauvel for the identification of this insect—specimens of a *Xantholinus* which had been representing *X. distans* Kr., in our collections, have been referred by him to the present species. We cannot find any previous record of *X. cribripennis*, and have therefore the pleasure of adding this species to the British list. The following are the characters by which it may be distinguished from *X. distans*, derived from Ganglbauer (*ex* Fauvel):—

Closely allied to *X. distans*, generally larger, with a pronounced bronze lustre, head more closely punctured on the sides. Thorax with the anterior angles more strongly rounded, with from thirteen to fifteen punctures in each dorsal series, those on the sides being twice as close, and very irregular. The elytra are longer, and more finely and closely punctured than in *X. distans*.

On comparing our series of the Irish species which we had supposed to be *X. distans* with the specimens named by M. Fauvel, and with types of the true *X. distans* (from Transsylvania), we find that they are all to be referred to *X. cribripennis*, Fauvel. The above-mentioned differences are very evident, except that the Irish specimens are rather smaller (7–8 mm.) than *X. distans*, but this character is of little value, within limits, as the species of *Xantholinus* often differ considerably in size: very possibly the Irish examples represent a small-sized race of the species. The general colour also seems to be lighter than in *distans*, especially that of the elytra, and the head and thorax have a very noticeable greenish-bronze lustre, of which, in our types of *X. distans*, there is scarcely a trace. The character of the punctuation offers the best means for distinguishing *X. cribripennis* from *X. distans*, the difference being at once apparent when actual types are compared.

Up to the present time *X. cribripennis* has only been found in the counties of Donegal and Derry. The Portrush record ('97 J. 1) is to be deleted, although the insect is exceedingly likely to be found in that locality, and indeed in other places in the north and west. Mr. C. W. Buckle has taken it in abundance at Magilligan, on the fringe of the sandhills, and in a similar situation near the golf-links at Buncrana. *X. cribripennis* is recorded from France and Italy, and, according to Reitter, a species (*X. fortispunctatus*) from the Caucasus is synonymous with it. It seems remarkable that the Irish records of *X. cribripennis* should be from the extreme north, in view of its very marked southern range on the Continent, but similar cases are known, that of *Hydroporus obsoletus*, Aubé, may be mentioned. We have not seen any examples of the insect recorded as *X. distans* from many northern localities in Great Britain, but it is likely that some of the specimens at least may be referable to the present species.

X. linearis, Ol.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

X. longiventris, Heer.

This species is often treated as a mere variety of the foregoing. If examined under a high power it may be recognised by the fact that the surface of the thorax is quite smooth between the punctures, and therefore more shining—while in *X. linearis* it is marked with exceedingly fine lines running in a transverse direction. In the Irish specimens of *X. longiventris* the thorax has fewer and coarser punctures, both in the dorsal series and on the sides; the elytra are slightly longer on an average, and much more finely punctured. In Ireland the preceding species is apparently the prevalent form—but *X. longiventris* has been found on the following localities:—Donegal (Bruckless, J.), Dublin (North Bull, Ht.), Wexford (Enniscorthy, Ht.), Kerry (Dingle, Valentia, and Kenmare, Ht.).

Leptacinus parumpunctatus, Gyll.

LEINSTER.

Dublin ('54 Hn.).

There are Irish examples in the Haliday collection.

L. batychnus, Gyll.

LEINSTER.

Dublin ('54 Hn. ; Howth and Dundrum, Ht.).

L. linearis, Grav.

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, 85 H.).—Fermanagh (Belleisle, '98 Pr.).—Dublin (Dundrum, Ht., coll. Bk.).—Clare (Broadford, Ht.).—Waterford (Tramore, Ht.).

Baptolinus alternans, Grav.

ULSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Glenshesk, Co.).—Armagh ('90 J. 2; Loughgilly, J.).—Fermanagh (Belleisle, '98 Pr.; Tempo, '97 L. 1).—Cork (Queenstown, '95 Wr.).—Kerry (Kenmare, Co.; Killarney, '55 Hn. 2; Muckross, Fg. MS.).

Local on decaying stumps, and under the bark of felled pines.

Othius fulvipennis, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

O. leviusculus, Steph.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Coolmore, '95 J. 1).—Antrim (Ballycastle, T.; Portrush, '90 J. 1).—Meath (Laytown, Ht.).—Westmeath (Athlone dist., '00 Ht. 1).—Dublin (North Bull, Ht.).—Waterford ('78 P.; Tramore, Ht.).—Kerry (Ballybunion, '98 C.).

O. melanocephalus, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

O. myrmecophilus, Kies.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Tyrone, Down, Armagh, Fermanagh, Sligo (Keashcorran, Ht.), Mayo (Achill), Galway, Dublin, Wicklow (Lugnaquilla), Kerry (Brandon).

In moss on hills. Described by Haliday as a new species—*sexpunctatus* (vide '41 H. 1).

Lathrobium elongatum, L.

ULSTER. LEINSTER. MUNSTER.

Donegal (north), Derry, Antrim, Down, Armagh, Fermanagh, Cavan (Lough Oughter), Dublin, Waterford (Glenshelane), Kerry (Killarney).

Much rarer than the following species.

***L. boreale*, Hoch.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Roscommon, Galway, Louth, Waterford, Cork, Kerry (Valentia, etc.).

Common, especially in mountain districts.

***L. fulvipenne*, Grav.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*L. rufipenne*, Gyll.—The record, Carlingford ('89 J. 4), must be erased.]

***L. brunnipes*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***L. longulum*, Grav.**

ULSTER. CONNAUGHT.

Armagh ('88 J. 5; Loughgilly, J.).—Fermanagh (Belleisle, '98 Pr.).—Galway (Lough Corrib near Oughterard, 95. Ht. 6).—King's County (Fin Lough near Clonmacnoise, '00 Ht. 1).

Lake shores.

***L. punctatum*, Zett.**

MUNSTER.

Waterford (Dunmore, Wr.).

Taken at Dunmore on August, 1894, J. J. Walker *in lit.* This species has been recorded from Eastern Prussia, Finland, Lapland, and Siberia (Ganglbauer), France (Acloque).

***L. filiforme*, Grav.**

ULSTER. MUNSTER.

Fermanagh (Belleisle, '98 Pr.).—Clare (Lough Doon, Ht.).—Waterford ('78 P.).

***L. quadratum*, Payk.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Lough Fea, Orr).—Down (near Belfast, '85 H.).—Armagh ('88 J. 5; Poyntzpass, '97 J. 2; Maghery, Lough Neagh, '95 J. 2).—Fermanagh (Belleisle, '98 Pr.).—

Roscommon (banks of the Suck, '98 Ht. 1).—Galway (Wr.).—Wicklow (Murrrough, C.).—Clare (Lough Doon, Ht.).—Cork Queenstown, '95 Wr.).—Kerry (Ballybunion, '98 C.; Kenmare, Ht.).

Local, in moss and flood refuse.

L. terminatum, Grav.

ULSTER. LEINSTER. MUNSTER.

Derry (Foyle dist., '00 B.).—Armagh ('88 J. 2; Mullinure, '94 J. 1).—Monaghan (Scotstown, J.).—King's County (Fin Lough near Clonmacnoise, '00 Ht. 1).—Kerry (Muckcross Woods, Hr.).

Var. *immaculatum*, Fowler.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Belfast, Sn.).—Armagh ('92 J. 4; Loughgilly, J.).—Monaghan (Scotstown, J.).—Mayo (Delphi, Ht.).—Galway (Leenane, Ht.).—Dublin (Raheny, '95 Ht. 3).—Kerry (Muckcross, Hr.).

The type form is rare in Ireland, being largely replaced by the variety *L. immaculatum*, Fowler.

[*L. pallidum*, Nord. The record, Coolmore ('94 J. Ht. Cr.), is to be deleted.]

L. multipunctum, Grav.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Coolmore, '95 J. 1).—Louth (Bellurgan, '88 J. 1).—Dublin ('54 Hn.).—King's County (Finlough near Clonmacnoise, '00 Ht. 1).—Limerick (Fg. MS.).—Waterford (Ardmore, '97 C.).—Cork (Bantry Bay, '47 W. 1).

L. angusticolle, Lac.

LEINSTER.

Dublin (a single specimen on the banks of the Dodder, near Firhouse, 54 Hn.).

Taken by Mr. A. H. Haliday (*vide* H. MS.). Unfortunately the specimen cannot be traced in his collection. No doubt the species awaits rediscovery in this locality, which is one very suited to the habits of the species. It has been recorded from Wales, northern England, the south of Scotland, and central Europe.

Cryptobium glaberrimum, Herbst.

ULSTER. CONNAUGHT. MUNSTER.

Armagh (common, '88 J. 2).—Fermanagh (Belleisle, '98 Pr.).—Galway (Wr.; Leenane, Ht.).—Kerry (Kenmare, Ht.).

Rather common where it occurs in moss, flood refuse, and under stones.

Stilicous rufipes, Germ.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Armagh, Galway, Meath, Dublin, Carlow, Waterford, Limerick, Kerry.

Common.

S. orbiculatus, Er.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster, also in the counties of Galway, Dublin, Carlow, Wexford, Cork, Kerry (Valentia, &c.).

S. similis, Er.

LEINSTER. MUNSTER.

Dublin (Templeogue, '00 Ht. 3).—Waterford ('78 P.).

Taken by Mr. G. P. Farren in flood-refuse from the River Dodder, in the month of September.

S. affinis, Er.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Armagh, Mayo (Achill), Galway, Louth, Meath, Dublin, Carlow, Waterford, Kerry.

Common.

S. geniculatus, Er.

CONNAUGHT.

Galway (Wr. in lit.).

Medon propinquus, Bris.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Galway (Wr.).—West Meath (Athlone, Ht.).—Dublin (Ht.).—Carlow ('95 Ht. 8).—Wexford (Enniscorthy, Ht.).—Kerry (Dingle and Kenmare, Ht.).

Common in moss.

M. melanocephalus, F.

MUNSTER.

Waterford ('78 P.).

The *Sunius melanocephalus* of ('85 H.) was no doubt intended for the preceding species.

M. obsoletus, Nord.

LEINSTER.

Dublin (Dundrum, '00 Ht. 3).

Rare, a single specimen taken in moss by Mr. E. F. Bullock.

Lithocharis ochracea, Grav.

ULSTER. LEINSTER.

Down (Holywood, H. MS.).—Armagh ('92 J. 4 ; Poyntzpass, '96 J. 6).—Fermanagh (Belleisle, '98 Pr.).—Dublin (Dodder banks, '54 Hn. ; Dundrum, '00 Ht. 8).

Common where found.

Sunius angustatus, Payk.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*Sunius intermedius*, Er.—The record, Armagh ('89 J. 1), is to be referred to *S. angustatus*, Payk.]

[*S. diversus*, Aubé.—The records, Foyle district (00' B.), Coolmore ('96 J. 2), Armagh ('89 J. 1), and Borris ('95 Ht. 8), are to be deleted.]

Pæderus littoralis, Grav.

CONNAUGHT.

Roscommon (Mote Park, '89 Ht. 1).

P. riparius, L.

ULSTER. LEINSTER. MUNSTER.

Down (Tollymore Park, '85 Pn.).—Wicklow (Murrough, M. coll.).—Wexford (south bank of Slaney estuary near Wexford, Ht.).—Waterford (Tramore, J. ; Ballyscanlan Lake, Ht.).—Kerry (Derrynane, '92 Cr. 4 ; south shore of Dingle Bay, '55 Hn. 2).

Rare, most of the records are of single specimens.

***P. fuscipes*, Curt.**

ULSTER. LEINSTER. MUNSTER.

Antrim (Lough Neagh, H. coll.; Rams Island, coll. Orr; Belfast, J.).—Wicklow (Murrrough, '57 H.).—Wexford (marsh near the town, Ht.).—Kerry (shore near Dingle, Ht.; Castlemaine, Fg. MS.; Kenmare, '98 Ht. 4).

Locally common. Mr. Orr found it abundantly under moss on the shore of Rams Island.

***Evsæsthetus scaber*, Thoms.**

MUNSTER.

Kerry (Kenmare, Ht.).

One specimen found in moss close to the shore, April, 1899.

***E. ruficapillus*, Lac.**

ULSTER.

Armagh ('92 J. 4).

The Armagh records of *E. scaber* and *E. læviusculus* ('92 J. 4) are to be referred to the present species.

***E. læviusculus*, Mann.**

CONNAUGHT.

Galway (Leenane, Ht.).

Found in flood-refuse from the Erriff River, in April.

***Dianous cœrulescens*, Gyll.**

ULSTER. LEINSTER. MUNSTER.

Antrim (Belfast dist., B. and Orr).—Down (Holywood, H. MS.; Rostrevor, Fg. MS.).—Armagh ('90 J. 2).—Dublin (Glencullen, '92 C. 4; Dodder banks near Tallaght, and mountain streams, '00 Ht. 3).—Cork (Glandore, coll. Sch.).

Abundant in wet moss on the waterfalls of mountain streams in the county of Antrim.

***Stenus guttula*, Müll**

ULSTER. LEINSTER. MUNSTER.

Donegal (Coolmore, '94 J. Ht. Cr.).—Antrim (Lough Neagh, H. MS.; quarries at Cave Hill, B.).—Down (Holywood, H. MS.).—Armagh ('90 J. 1).—Dublin (Dodder banks, &c., '54 Hn.; Tallaght,

'93 C.; Rush, '94 C. 2; Lambay, '96 C.).—Limerick (Fg. MS.).—Kerry (Ballybunnion, '98 C.; Waterville, coll. Yr.).

Common where it occurs.

[*S. bipunctatus*, Er. Haliday mentions *S. bipunctatus* in his Belfast list ('85 H.). We are inclined to believe this record was intended for some other than the present species, as Haliday queries the name *bipunctatus* in his MS. list of Irish species.]

***S. bimaculatus*, Gyll.**

ULSTER. LEINSTER. MUNSTER.

Antrim, Armagh, Cavan, Dublin, Limerick, Waterford, Kerry.
Rather common.

***S. Juno*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***S. ater*, Mann.**

ULSTER.

Fermanagh (Lower Lough Erne, Ch., coll. Cs.).

***S. Guynemeri*, Duv.**

CONNAUGHT. MUNSTER.

Sligo (Glencar, Cs.).—Kerry (Killarney, '91 F. 1).

Rare. Distribution—western Europe, and the Mediterranean region. In Great Britain it is found chiefly in hilly districts from Kent to Clyde, and it would seem to be rare in the east.

***S. speculator*, Er.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. The record, Armagh ('92 J. 4), for the variety *Rogeri*, Kr., should refer to this species.

***S. lustrator*, Er.**

CONNAUGHT.

Mayo (Achill, '98 Ht. 2).

Taken on the summit of Slievemore, in April.

S. palposus*, Zett.S. palposus*, Zett.*S. buphthalmus*, Gyll.*S. carbonarius*, Er.*S. argentellus*, Thoms.

ULSTER.

During the summer of 1900 we received from Mr. H. L. Orr a number of beetles from the Lough Neagh district for identification. Amongst these was a peculiar *Stenus*, which did not agree with any of the known British species. We sent this specimen to Dr. Sharp, and he informs us that it agrees with the *S. argentellus*, Thoms., of his collection, a species previously unknown in the British Isles. Mr. Orr says the collection, of which it formed part, was handed to him by Mr. R. Patterson. The exact place of capture was not noted, but it was certainly taken on the shore of Lough Neagh, between Toome and the mouth of the Ballinderry River.

Stenus palposus belongs to section II. of the arrangement adopted by Canon Fowler (91 F. 1), *i.e.*, those species having the penultimate segment of the tarsi scarcely broader than the third segment, hind body plainly margined at sides, and the elytra black. The following is a short description of the L. Neagh specimen, which agrees with a type of *S. palposus* received from M. Fauvel:—

The entire insect is dull black, covered with rather coarse white pubescence, which, in certain lights, forms a noticeable spot near the apex of each elytron. Head—including the eyes—broader than the thorax, with very shallow frontal furrows, the intermediate space being but slightly raised, closely punctured. Antennæ short and stout, the three terminal segments forming a rather distinct club. Thorax longer than broad, slightly rounded in front, and gradually narrowed to base, very closely and deeply punctured. Elytra a little longer than thorax, with the sides scarcely rounded, not narrowed in front, and covered with extremely confluent punctures. Hind body parallel sided, the basal segments being strongly punctured and bearing four longitudinal keels. Length 4.6 mm.

Stenus palposus may be distinguished from *S. buphthalmus*, its nearest British ally, through its larger size, stronger pubescence, shorter and stouter antennæ, and by being more closely and deeply punctured throughout. Ganglbauer records *S. palposus* as rare in northern and central Europe—on sandy river banks. It would seem to be a rare species in France.

S. bupthalmus, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

S. melanopus, Marsh.

ULSTER. CONNAUGHT.

Antrim (Lagan banks near Moira, coll. B.).—Galway (banks of the R. Corrib near Galway, '95 Ht. 6).

The *S. nitidus*, Er., of Hogan's Dublin ('54 Hn.) list may have been this species, but confirmation of the record is desirable.

S. melanarius, Steph.

ULSTER.

Derry (Culmore, Fauvel, coll. B.).

[*S. atratulus*, Er.—The records, Holywood ('92 J. 5), and Armagh ('89 J. 4), are to be referred to *S. declaratus*, Er.]

S. canaliculatus, Gyll.

ULSTER. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim and Down (Lagan Canal bank, Ht., coll. B.; near Belfast, '91 F. 1).—Armagh ('92 J. 4).—Dublin (Portmarnock, salt marsh, '00 Ht. 3).

S. nitens, Steph.

ULSTER.

Armagh ('94 Sp.).

The record *S. æmulus*, Er., in ('78 M.), is probably due to mere confusion of names.

S. pusillus, Er.

ULSTER. MUNSTER.

Donegal (Portsalon, Sn.).—Antrim (White Park, T.).—Waterford ('78 P.).

S. exiguus, Er.

ULSTER.

Antrim (Knocklaid near Ballycastle, Ch., coll. Cs.).

S. fuscipes, Grav.

ULSTER. CONNAUGHT. MUNSTER.

Down (near Belfast, '85 H.).—Armagh ('88 J. 2).—Galway (Wr.).—Kerry (Dingle, Ht.).

S. vafellus, Er.

MUNSTER.

Killarney ('91 F. 1).

S. declaratus, Er.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. The *circularis* of the reference ('85 H.), and probably also of ('47 W. 1), is to be referred to the present species.

S. crassus, Steph.

ULSTER. MUNSTER.

Donegal and Derry (Foyle dist, '00 B.).—Antrim (near Belfast, Ht., coll. B.).—Kerry (Dingle, Ht.).

The variety *littoralis*, Grav., has been found in the Foyle district ('00 B.), on the Dublin coast (Portmarnock, '00 Ht. 6), and on the shore of L. Neagh near Shane's Castle (coll. B.).

S. carbonarius, Gyll.

ULSTER. MUNSTER.

"Lough Neagh, Haliday," (Fg. MS.).—Cavan (Lough Oughter, '94 J. Ht. Cr.).—Limerick (lake shores, Ht.).—Kerry (Derrycunihy Wood, Cs.; Killarney '91 F. 1).

[*S. argus*, Grav.—The record, 'Armagh ('88 J. 2) should refer to *S. impressus*, Germ.]

S. brunnipes, Steph.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

S. ossium, Steph.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Fermanagh, Sligo, Mayo (Achill), Galway, Louth, Dublin, Wexford, Waterford, Cork, Kerry.

Common.

[*S. fuscicornis*, Er.—Armagh ('89 J. 4); this record must be erased.]

S. geniculatus, Grav.

ULSTER.

Down (Newcastle, '91 F. 1 col. C.).

***S. impressus*, Germ.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***S. srossus*, Er.**

MUNSTER.

Waterford ('78 P.).

The record, Armagh ('89 J. 1), is to be deleted.

***S. Erichsoni*, Rye.**

CONNAUGHT.

Galway (Wr., in litt.).

***S. flavipes*, Steph.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Armagh, Fermanagh, Galway, Dublin, Wicklow, Kilkenny, Wexford, Waterford, Cork, Kerry.

Locally common.

***S. pubescens*, Steph.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Derry, Antrim, Down, Armagh, Fermanagh, Galway, Louth, Dublin, Wexford, Waterford, Limerick, Cork, Kerry.

Common.

***S. binotatus*, Ljun.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (Lagan Canal near Belfast, Ht., coll. B.).—Armagh ('88 J. 2; '94 Sp.).—Roscommon (Mote Park, Ht.).—Wexford (Courtown, '92 C. 6).—Waterford (Tramore, Ht.).—Cork (Shepperton Lakes near Glandore, Ht.).

[*S. canescens*, Ros.—The Armagh record ('89 J. 4) is to be referred to *S. pubescens*, Steph.]***S. pallitarsis*, Steph.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***S. bifoveolatus*, Gyll.**

ULSTER. CONNAUGHT. MUNSTER.

Donegal (Bundoran, J.).—Derry (Foyle dist., '00 B.).—Antrim (Lisburn, B.).—Armagh ('92 J. 4).—Cavan ('94 J. Ht. Cr.).—Galway (Clonbrock, Ht.).—Waterford ('78 P.).

***S. nitidiusculus*, Steph.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***S. picipennis*, Er.**

LEINSTER.

Dublin (Tallaght, '00 Ht. 3).

A single specimen on the Dodder bank, June, 1895.

***S. picipes*, Steph.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***S. cicindeloides*, Grav.**

ULSTER. LEINSTER. MUNSTER.

Antrim (Lagan Canal, B.).—Armagh ('89 J. 4).—Dublin (Portmarnock, '94 Ht. 3; Tallaght, &c.).—Kilkenny (Thomastown, Ht.).—Waterford (Lismore and Tramore, Ht.).—Kerry (Ventry, Ht.).

***S. similis*, Herbst.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***S. tarsalis*, Ljun.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***S. paganus*, Er.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster, Sligo, Westmeath, Dublin, Kilkenny, Wexford, Waterford, Kerry.

***S. latifrons*, Er.**

ULSTER. LEINSTER.

Antrim (Lagan Canal near Belfast, Ht., coll. B.).—Westmeath (Lough Ennell, Ht.).

This species has been recorded from various localities in error, *S. brunnipes* or *S. paganus* having been mistaken for it.

***S. fornicatus*, Steph.**

ULSTER.

Donegal (Coolmore, '95 J. 1).

Rare, taken under stones.

***Blodius spectabilis*, Kr.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Buncrana, '95 Wr.).—Down (Strangford Lough, B; Dundrum Bay, H. MS.).—Sligo (Enniscrone, J.).—Dublin (North Bull and Howth, '78 M.).—Wicklow (Bray, M. cell.).

Local.

[*B. tricornis*, Herbst. The record, North Bull ('54 Hn.), is to be referred to the foregoing species.]

***B. arenarius*, Payk.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Buncrana, '95 Wr.; Ardara, '92 J. 3; Coolmore, '94 J. Ht. Cr.).—Derry (Magilligan, '00 B.).—Sligo (Enniscrone and Rosser Point, J.).—Mayo (Achill, '98 Ht. 2).—Dublin (Baldoyle and Port-Marnock, '54 Hn.; North Bull, '00 Ht. 3).

Common.

***B. pallipes*, Grav.**

ULSTER.

Donegal (Ardara, '92 J. 3).

In sand near the sea shore.

***B. fuscipes*, Rye.**

ULSTER. CONNAUGHT.

Donegal (Coolmore, '94 J. Ht. Cr.).—Derry (Foyle dist., coll. B.).—Sligo (Enniscrone, J.).

***B. subterraneus*, Er.**

ULSTER.

Derry (Magilligan, Ht., coll. B.).—Antrim (Lough Neagh dist, H.; '47 W. 2).—Armagh (Maghera, Lough Neagh, '95 J. 3).

Common at Lough Neagh.

***B. longulus*, Er.**

ULSTER. CONNAUGHT.

Donegal (Coolmore, L.).—Derry (Magilligan, '00 B.).—Sligo (Enniscrone, J.).—Mayo (Achill, '98 Ht. 2).

***B. fracticornis*, Payk.**

ULSTER. LEINSTER.

Armagh (Maghery, Lough Neagh, '96 J. 1; Tynan, '95 J. 2).—Dublin (Portmarnock, '00 Ht. 3).

On the sandy shore of Lough Neagh, and at Tynan on a somewhat sandy place on the canal bank. As the canal comes from Lough Neagh it is probable that the beetles were carried up in barges which are often laden with sand from the lake shore at Maghery. At Portmarnock the black form only was found.

***B. opacus*, Block.**

ULSTER. LEINSTER.

Donegal (Ardara, J.).—Antrim (near Belfast, '85 H.).—Armagh (Maghery, Lough Neagh, J.).—Longford (Inchcleraun, Lough Ree, '00 Ht. 1).—Dublin (North Bull, '00 Ht. 3).

***B. atricapillus*, Germ.**

LEINSTER.

Dublin (Killiney, '78 M.).

***B. erraticus*, Er.**

ULSTER. CONNAUGHT.

Donegal (Coolmore, '95 J. 1).—Derry (Magilligan sands, '00 B.).—Sligo (Enniscrone, J.).

Taken commonly among sandhills close to the sea-shore. Ganglbauer records *B. erraticus* as a rare species in central Europe, occurring chiefly on sandy river banks in mountain districts.

***Platystethus arenarius*, Fourc.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. cornutus*, Gyll.**

CONNAUGHT. MUNSTER.

Galway (Wr.).—Waterford ('78 P.).—Cork (Middleton and Queens-town, '95 Wr.).

[*P. nodifrons*, Sahl. Armagh ('89 J. 4). This record must be referred to *P. arenarius*, Fourc.]

Oxytelus rugosus, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

O. sculptus, Grav.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down, Armagh, Fermanagh, Galway, Dublin, Clare, Waterford.
Probably common, but we have few records.

[*O. insecatus*, Grav. The record, Armagh ('89 J. 4), is to be deleted.]

O. laqueatus, Marsh.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*O. picus*, L. — The records, Belfast ('85 H.), and Dublin ('54 Hn.), are to be referred, no doubt, to *O. sculptus*, Grav. (see Waterhouse's catalogue), so far as we are aware the true *picus*, L., has not been found in Ireland.]

O. inustus, Grav.

CONNAUGHT. LEINSTER.

Roscommon (Mote Park, '98 Ht. 1).—Louth (Carlingford, '89 J. 4).

O. sculpturatus, Grav.

ULSTER. LEINSTER. MUNSTER.

Antrim (Ballycastle, T.).—Down (near Belfast, '85 H.).—Armagh ('92 J. 4).—Louth (Carlingford J.).—Dublin ('54 Hn.).—Wexford (Ht.).—Clare (Sp.).—Limerick (Ht.).

Common.

O. maritimus, Thoms.

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Foyle dist., '00 B.).—Mayo (Achill, '98 Ht. 2).—Galway (Roundstone, Ht.).—Meath (Laytown, '00 Ht. 3).—Dublin (North Bull, '00 Ht. 3).

Under sea-weed, often between tide-marks. Both the type, and the variety with yellowish elytra, occurred plentifully near Roundstone. Specimens of the latter, sent to M. Fauvel, have been named "*var. Perrisi*, Fvl."

***O. nitidulus*, Grav.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Armagh, Cavan, Louth, Dublin, Cork, Kerry.
Common.

***O. complanatus*, Er.**

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.)—Armagh ('89 J. 4).—Dublin ('00 Ht. 3).

***O. tetracarínatus*, Block.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*O. Fairmairei*, Pand.—The record, Armagh ('91 J. 2), is to be deleted.]

***Haploderus cœlatus*, Grav.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster; also in the counties of Galway, Louth, Wicklow, Limerick, Kerry (Valentia, Gt. Blasket, Kenmare, &c.).

***Ancyrophorus omalinus*, Er.**

LEINSTER.

Wicklow (Bray, '91 F. 1).

The records ('00 B., and '96 Jn.) are to be referred to the following species.

***A. aureus*, Fauv.**

ULSTER. LEINSTER. MUNSTER.

Derry (Culmore, in a mossy bank, coll. B.).—Antrim (Cave Hill, Sh., coll. B.).—Fermanagh (Coolarkin Cave, near Enniskillen, coll. Jn.).—Kilkenny (Cave of Dunmore, Ht.).—Tipperary (Mitchelstown Cave, Sh., coll. Jn.).

Local. *Ancyrophorus* would seem to be a habitual denizen of caves in Ireland. One of us has observed it in the innermost recesses of the Cave of Dunmore, crawling over dripping-wet rocks, in company with various species of *Collembola*. No doubt it preys on the latter in such localities.

***Trogophloeus arcuatus*, Steph.**

CONNAUGHT. LEINSTER.

Sligo (Lough Gill, '01 D.N.F.C.).—Wicklow (Bray, '91 F. 1, coll. Ch.)—Wexford (Slaney Valley near Enniscorthy, Ht.).

Rare.

T. bilineatus, Steph.

ULSTER. LEINSTER. MUNSTER.

Donegal, Down, Armagh, Fermanagh, Dublin, Carlow, Kerry.
Common.

T. rivularis, Mots.

ULSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Ballintoy, Ht., coll. Cs.).—
Armagh ('92 J. 4).—Waterford, ('78 P.).

T. elongatulus, Er.

ULSTER. LEINSTER.

Antrim (Lagan canal near Belfast, Ht., coll. B.).—Armagh ('89
J. 4).—Dublin (Lucan, '00 Ht. 3).—Carlow (Borris, '95 Ht. 8).

T. fuliginosus, Grav.

ULSTER. LEINSTER.

Derry (Culmore, '00 B.).—Down (Lagan Canal near Moira, Ht.,
coll. B.).—Kilkenny (Thomastown, Fauvel, coll. Ht.).

[*T. foveolatus*, Sahl.—The record, Armagh ('91 J. 3), should refer
to *T. corticinus*, Grav.]

T. corticinus, Grav.

ULSTER. LEINSTER. MUNSTER.

Donegal, Armagh, Carlow, Wexford, Clare, Waterford, Kerry.
Common.

T. pusillus, Grav.

LEINSTER.

Dublin (Dodder banks, '54 Hn.).

There are specimens of this species in the Haliday collection,
which are probably those recorded from Dublin.

T. tenellus, Er.

LEINSTER.

Dublin (banks of the Dodder, '00 Ht. 3).

The Armagh record ('89 J. 4) is to be deleted.

Thinobius linearis, Kr.

ULSTER.

Donegal (Foyle dist., '00 B.).

Named by Dr. Sharp.

***T. longipennis*, Heer.**

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Dublin (Dodder banks near Firhouse, '54 Hn.).

Found amongst moist gravel on the Dodder banks by Mr. Haliday.

***Syntomium seneum*, Müll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Cave Hill, coll. B.).—Armagh ('90 J. 1).—Galway (Dinish Island, '91 F. 1).—Wicklow (H. MS.).—Cork (Kanturk and Bantry, '47 W. 1; Corkroad and Charleville, Fg. MS.).

Rare—in moss on old stumps.

***Coprophilus striatulus*, F.**

ULSTER.

Down (Holywood, in sand pits, H. MS.). Fermanagh (Coolarkin Cave near Enniskillen, '96 Jn.).

***Deleaster dichrous*, Grav.**

LEINSTER.

Dublin ('54 Hn.).

In the Haliday collection there is an Irish example of this species, referable to the variety *Leachi*, Curt., this is possibly the specimen referred to by Hogan. Distribution, central Europe and the east Mediterranean region. Thomson does not mention it as a native of Scandinavia. In Great Britain it has been found in various localities in England and Wales, and as far north as the Solway and Forth districts.

[*Anthophagus testaceus*, Grav.—Down (near Belfast, '85 H.). Somewhat doubtful as an Irish species; inserted on the strength of the *Lesteva caraboides* in the above reference. The species, however, cannot be traced in the Haliday collection.]

***Anthophagus alpinus*, Payk.**

ULSTER.

Down (summit of Slieve Donard, '75 Ch. 2).

Widely distributed over northern and alpine Europe.

[*Geodromicus nigrita*, Müll.—Newcastle ('91 F. 1). There may be

some error over this record as *G. nigrita* is not mentioned amongst Mr. G. C. Champion's Newcastle records (see '75 Ch. 2). This species, however, very probably occurs in Ireland, as it has a wide range over northern and central Europe, Siberia, and occurs in north America.]

***Lesteva longelytrata*, Goeze.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Buncrana, '95 Wr., &c.).—Antrim (Belfast dist., B.).—Down (near Belfast, '85 H.; Holywood H. coll.).—Armagh ('92 J. 4; Portadown, '88 J. 2; Maghery, Lough Neagh, J.).—Dublin (Dodder banks, '54 Hn.).—Wicklow (Blessington, '00 Ht. 3).—Kerry (Ballybunion, '98 C.).

Frequent.

***L. Sharpi*, Rye.**

LEINSTER. MUNSTER.

Wicklow (Lugnaquilla, H. coll.).—Kerry (Brandon, H. coll.).

Taken on the summits of Lugnaquilla and Brandon by Mr. A. H. Haliday and recorded by him as a new variety—*collina*—of *L. longelytrata* ('55 H. 1; see also '66 R. 1). The Wicklow specimens, labelled in Haliday's handwriting, are at present in the Dublin Museum collection. Dr. Sharp has verified one of these as the present species. The record, Armagh ('92 J. 4), is to be deleted. *L. Sharpi* has been recorded from the Alps, Scotland (Highlands), north of England (Northumberland), and Wales.

***L. pubescens*, Mann.**

ULSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Coolmore, J.).—Antrim (Belfast dist., B.).—Armagh (J.).—Kerry (Valentia, '98 Ht. 3).

Mr. C. W. Buckle finds this species in company with *Dianous* in the wet moss of waterfalls, near Belfast. It no doubt occurs at intermediate localities in the remaining provinces. Distribution, northern and central Europe.

***L. sicula*, Er.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Galway, Dublin, Kerry.
Common.

***L. punctata*, Er.**

ULSTER. CONNAUGHT.

Donegal (Foyle dist., coll. B.).—Mayo (Delphi, Ht.).—Galway (Wr.).

A single specimen occurred under rushes on the shore of Doo Lough in the county Mayo, April. Distribution—central Europe, Wales, Scotland as far north at least as Moray, and it no doubt occurs in the north of England.

***Acidota crenata*, F.**

ULSTER. CONNAUGHT.

Donegal (Buncrana sandhills, '00 B.).—Antrim (found floating on the Lagan Canal, B.).—Down (Holywood, H. MS.; Newcastle sands, '00 J. 3).—Fermanagh (Marble Arch, Cs.).—Sligo (Glencar, Cs.).

Rare. The records, Armagh ('88 J. 5; '91 J. 2; '92 J. 4), are to be deleted. Rare in Great Britain, occurring chiefly in mountain districts as far north as Caithness. Ganglbauer records it from northern and central Europe, Caucasus, Siberia, and North America.

***Olophrum piceum*, Gyll.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal, Antrim, Down, Armagh, Fermanagh, Sligo, Mayo (Achill and Ballinakill), Dublin, Wicklow.

***O. fuscum*, Grav.**

LEINSTER.

Carlow (Graiguenamanagh, '95 Ht. 8).

Under dead leaves in a wood on the Barrow banks, April, 1895.

***Lathrimæum atrocephalum*, Gyll.**

ULSTER. LEINSTER.

Down (near Belfast, '85 H.).—Armagh ('92 J. 4).—Carlow (Borris, '95 Ht. 8).

***L. unicolor*, Steph.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal, Armagh, Cavan, Galway, Dublin, Carlow.

***Deliphrum tectum*, Payk.**

ULSTER. LEINSTER.

Down (near Belfast, '85 H.).—Queen's County (Abbeyleix, Ht., coll. Bn.).

***Arpedium brachypterum*, Grav.**

ULSTER. CONNAUGHT.

Donegal (Rathmullan, Wr.).—Down (Slieve Donard, '55 H. 1; Ch.).—Mayo (Achill, summit of Slievemore, '98 Ht. 2).

Occurs on mountain summits. The record, Carlingford ('88 J. 2), is to be deleted. Distribution—northern Europe, Switzerland, Siberia, and North America; it is a common species in Scotland, but rare in the north of England, and Wales.

***Micralymma brevipenne*, Gyll.**

ULSTER. LEINSTER. MUNSTER.

Down (Strangford Lough, '55 H. 1; Holywood, H. coll.).—Meath (mouth of the Boyne, '94 Ht. 2).—Wicklow (rock pools near Grey-stones, '00 Ht. 3, coll. Cr.).—Waterford (Tramore, Ht.).—Cork (banks of the Owenbeg River, Cork Harbour, '55 H. 1).—Kerry (Dingle, '94 Ht. 2).

Locally common on the coast, often between tide-marks. Occurs on the coasts of western Europe from France to Scandinavia.

***Philorhinum sordidum*, Steph.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Down, Armagh, Galway, Dublin, Wexford, Waterford, Cork, Kerry.

Common on gorse.

***Coryphium angusticolle*, Steph.**

ULSTER.

Derry (Culmore, one specimen by sweeping grass, '00 B.).—Down (sea coast at Holywood, '41 H. 1; '55 H. 1; in a rotten stump H. MS.). Distribution—northern and central Europe. The species is rare in Great Britain, but ranges from Hastings to the Clyde district.

***Omalium rivulare*, Payk.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster, Mayo (Achill), Louth, Dublin, Cork, Kerry (Valentia, etc.).

O. læviusculum, Gyll.

ULSTER. CONNAUGHT. MUNSTER.

Donegal (Buncrana, '95 Wr.).—Down (Helen's Bay, B.).—Mayo (Achill, Ht.).—Cork (Glandore, Ht.).—Kerry (Beginnish Island, '98 Ht. 3; Kenmare, Ht.).

Locally abundant, under drying sea-weed.

O. riparium, Thoms.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common on the coasts of Ulster, and the counties of Sligo, Mayo (Achill, etc.), Galway (Roundstone, etc.), Louth, Meath, Dublin. Clare, Waterford, Cork, Kerry (Dingle, Beginnish, etc.).

Rather commoner than *O. rivulare*, Payk., on the Irish coast.

O. Allardi, Fairm.

ULSTER. LEINSTER. MUNSTER.

Donegal (Coolmore, '95 J. 1).—Armagh ('90 J. 1).—Dublin (Dundrum, '00 Ht. 3).—Waterford ('78 P.).

In moss—not common.

O. oxyacanthæ, Grav.

ULSTER. MUNSTER.

Armagh (J.).—Clare (Glenomeragh, Ht.).

O. excavatum, Steph.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down (Holywood), Armagh, Sligo, Galway, Dublin, Wexford, Cork, Kerry.

O. cæsum, Grav.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Ballycastle, T.).—Armagh ('90 J. 1).—Meath (Laytown, '00 Ht. 3).—Dublin (Portmarnock, '00 Ht. 3).—Waterford ('78 P.).

O. pusillum, Grav.

ULSTER. CONNAUGHT.

Donegal and Derry (Foyle dist., '00 B.).—Armagh, (J. ; Poyntzpass, '00 J. 3).—Galway (Tuam, '95 Cr. 1).

Under fir-bark, local.

O. punctipenne, Thoms.

ULSTER. CONNAUGHT. LEINSTER.

Antrim (Cave Hill, B.).—Armagh (J.; Poyntzpass, '00 J. 3).—
 Roscommon (Mote Park, '98, Ht. 1).—Carlow (Borris, '95 Ht. 8).
 Under bark of ash, beech, and other trees.

O. rufipes, Fourc.

ULSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Kilroot '00
 J. 4).—Armagh ('92 J. 4).

O. vile, Er.

ULSTER.

Antrim (Carr's Glen, coll. B.).

O. brevicorne, Er.

LEINSTER.

Dublin (Lucan Demesne, under bark, Sh., coll. Ht.).

O. iopterum, Steph.

CONNAUGHT.

Roscommon (Mote Park, '98 Ht. 1).

O. concinnum, Marsh.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Armagh ('88 J. 2; Poyntz-
 pass, '97 J. 2; Maghery, Lough Neagh, and Portadown, J.).—Galway
 ('91 F. 1; Clonbrock, Ht.).—Dublin (Dundrum, '00 Ht. 3).—
 Waterford ('78 P.).

O. deplanatum, Gyll.

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Armagh (J.).—Dublin ('54 Hn.).—
 Waterford ('78 P.).

O. striatum Grav.

ULSTER. CONNAUGHT.

Antrim (Armoy, Ht., coll. Cs.).—Galway ('91 F. 1, coll. Wr.).

Hapalaræa pygmæa, Gyll.

ULSTER.

Antrim (near Belfast, '89 J. 4).

Taken by Mr. R. Templeton and now in collection of Belfast Nat. Hist. and Philosophical Society.

Eusphalerum primulæ, Steph.

ULSTER.

Down (Bangor, not rare, '95 Wr.).

Anthobium minutum, F.

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Cushendun, J.).—Down (Lagan, near Moira, B.).—Armagh ('89 J. 4).—Roscommon (Mote Park, Ht.).—Westmeath (Mullingar dist., Ht.).

Common in boggy places.

A. ophthalmicum, Payk.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Ballycastle, Cs.).—Down (Narrow Water, '94 D.N.F.C.).—Galway (Woodford, Ht.).—Wicklow (Ovoca, H. coll.).—Queen's County (Abbeyleix, Bn.).—Kilkenny (Ht.).—Wexford (Ht.).—Waterford (Lismore, '95 Ht. 1).—Kerry (Loo Bridge, Cs.).

Proteinus ovalis, Steph.

ULSTER. CONNAUGHT. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Armagh ('88 J. 5).—Fermanagh (Belleisle, Pr.).—Galway (Clonbrock, D.).—Dublin (Ht.).—King's County (Tullamore, '95 Ht. 5).—Carlow (Borris, '95 Ht. 8).

P. brachypterus, F.

ULSTER. LEINSTER.

Antrim (Ballycastle, Cs.).—Down (near Belfast, '85 H.).—Dublin ('54 Hn.).

P. atomarius, Er.

LEINSTER.

Dublin (Portmarnock, '54 Hn.).

Megarthus denticollis, Beck.

ULSTER. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.)—Antrim (White Park, T.)—Tyrone (Kildress, J.)—Armagh ('88 J. 2; Loughgilly, J.)—Dublin (Ht.).

[*M. affinis*, Mill. The record, Armagh ('90 J. 1), is to be deleted.]

M. depressus, Lac.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

M. sinuato-collis, Lac.

ULSTER. LEINSTER.

Antrim (Ballycastle dist., Cs. & T.)—Armagh (J.)—Fermanagh (Tempo, Sch.)—Wexford (Slaney estuary, Ht.).

M. hemipterus, Ill.

ULSTER.

Armagh (rare in moss, J.).

Phloeobium clypeatum, Müll.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist.), Down (Belfast dist.), Armagh, Dublin, Wicklow, Carlow, Waterford, Cork.

Phloeocharis subtilissima, Mann.

MUNSTER.

Kerry (Valentia Island, '98 Ht. 3).

Taken commonly by Miss M. J. Delap, in decaying *Fuchsia* sticks and in moss.

Pseudopsis sulcata, Newm.

ULSTER. LEINSTER.

Down (Holywood, '95 Ht. 2, H. coll.)—Wicklow (Ovoca, '95 H. 2).—Lough Neagh (H.).

This species has not been found in Ireland since Haliday's time, but it is probably much more widespread than these localities indicate. Abroad it has been recorded from France and the Mediterranean region, Caucasus, and in North America. And in Great Britain it ranges from Kent into the northern parts of England.

***Prognatha quadricornis*, Lac.**

LEINSTER.

Carlow (Borris, '95 Ht. 8).

Under bark of moist decaying ash stump, April, 1895. This species is recorded as occurring under the bark of various trees in central Europe. Thomson does not mention it from Scandinavia, and according to Fowler ('91 F. 1) it has not been recorded from the extreme north of England or from Scotland.

PSELAPHIDÆ.

***Pselaphus Heisei*, Herbst.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Coolmore, '96 J. 2).—Down (near Belfast, '85 H.; Newcastle, Fg. MS.).—Armagh ('92 J. 4).—Galway ('91 F. 1).—Dublin (Malahide Hill, '54 Hn.).—Carlow (Borris, '95 Ht. 8).—Limerick (Fg. MS.).—Kerry (Kenmare, Ht.).

In damp moss; fairly common.

***P. dresdensis*, Herbst.**

ULSTER.

Armagh ('92 J. 1; '94 J. 1).

In wet moss and flood refuse. It has only occurred at Armagh where Mr. Johnson took it in three different localities, but he obtained the greatest number in flood rubbish in Mullinure. It is extremely sluggish, and from its superficial resemblance to *P. Heisei* might easily be overlooked. It inhabits very wet moss and appears to exist in the imago for only a short time, as it occurred abundantly in January, but in the following month it was not to be found, though the same conditions were present. Extremely rare in Great Britain where it has been recorded from a few localities in the eastern parts of England as far north as the Tweed district. Abroad it is found in Scandinavia, northern and central Europe, and in the north of France.

***Tychus niger*, Payk.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist.), Down (Belfast), Armagh, Dublin, Wexford, Limerick.

Bythius puncticollis, Denny.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Ballycastle, Ca.; Cushendun, J.).—Armagh ('88 J. 2; Newtown Hamilton, J.).—Sligo (Glencar, Ca.).—Kerry (Valentia, Ht.).

B. validus, Aubé.

ULSTER.

Donegal (Foyle dist., Ch., coll. B.).

B. bulbifer, Reich.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim (Ballycastle), Armagh, Galway, Limerick, Dublin, Carlow, Kerry (Valentia, &c.).

Common.

Bryaxis sanguinea, L.

ULSTER. LEINSTER.

Down (near Belfast, '85 H.; banks of Lagan Canal near Moira, Ht., coll. B.).—Wicklow (Murrrough, C.).

B. Waterhousei, Rye.

LEINSTER.

Dublin (Portmarnock, '00 Ht. 3).

Very local; under stones on a low grassy bank close to high-water mark. The species is locally distributed in the south of England, France, and the west Mediterranean region.

B. fossulata, Reich.

ULSTER. LEINSTER.

Antrim, Armagh, Cavan, Wicklow, Wexford.

B. Helfer, Schmidt.

ULSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Kerry (Kenmare, '98 Ht. 4).
Rare; under stones on the coast.

B. hæmatica, Reich.

CONNAUGHT. MUNSTER.

Galway ('91 F. 1, coll. Wr.).—Limerick (Fg. MS.).—Cork (Queentown, '95 Wr.).

B. juncorum, Leach.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster, and in the counties of Galway, Dublin, Wicklow, and Kerry (Valentia, &c.).

Euplectus Karsteni, Reich.

LEINSTER.

Dublin ('54 Hn.; Dundrum, Ht., coll. Bk.).—Wicklow (Ashford, Fg. MS.).

E. sanguineus, Denny.

LEINSTER.

Dublin (Dundrum, '00 Ht. 3, coll. Bk.).

E. ambiguus, Reich.

ULSTER.

Armagh ('89 J. 1; Poyntzpass, '96 J. 2).

Common in wet moss and flood refuse.

Claviger testaceus, Preyss.

MUNSTER.

Waterford ('78 P.; "in the autumn" '58 Js.).

This interesting species occurs in ants' nests (*Lasius flavus*) in Great Britain from Devon to the Forth district. Dr. Power specially mentions it as one of the rare English species which he found abundantly in the Waterford district. It probably occurs in other places in Ireland, but has been overlooked owing to its peculiar habitat. Northern and central Europe (Reitter).

SCYDMÆNIDÆ.

Neuraphes elongatulus, Müll.

ULSTER. CONNAUGHT.

Armagh ('92 J. 4).—Galway ('91 F. 1, coll. Wr.).

N. angulatus, Müll.

ULSTER.

Armagh (Loughgilly, J.).—Ireland (H. coll.).

***Scydmænus scutellaris*, Müll.**

LEINSTER.

Dublin (Tallaght, '00 Ht. 3).

Found in a nest of *Lasius niger* on the Dodder bank.***S. collaris*, Müll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***S. exilis*, Er.**

MUNSTER.

Cork (Glandore, Ch., coll. Ht.).

A single specimen of this species was found under a stone close to the shore.

***Euconnus hirticollis*, Ill.**

ULSTER. LEINSTER.

Armagh (Loughgilly, J.).—Monaghan (Scotstown, J.).—King's County (near Clonmacnoise, '00 Ht. 1).

***E. fimetarius*, Chaud.**

LEINSTER.

Dublin (Dundrum, '00 Ht. 3, coll. Bk.).

***Eumicrus tarsatus*, Müll.**

ULSTER. LEINSTER. MUNSTER.

Down (Holywood and Strangford, H. MS.).—Armagh ('89 J. 4).—Dublin ('54 Hn.; Dundrum, Ht., coll. Bk.).—Wicklow (Bray, H. MS.).—Limerick and Waterford (Fg. MS.).

***Eutheia plicata*, Gyll.**

ULSTER.

Down (Holywood, H. MS.).

Haliday's specimens are in the Dublin Museum.

LEPTINIDÆ.

Leptinus testaceus, Müll.

ULSTER. MUNSTER.

Derry (Foyle dist., '00 B.).—Kerry (Kenmare, Ht., coll. Yr.).

Found in the tunnel leading to a nest of *Bombus terrestris* in the first locality, and a single example occurred on a field mouse (*M. sylvaticus*) sent from the Kenmare district by Col. J. W. Yerbury. Widely distributed in Great Britain extending as far north as the Forth and Clyde districts. Also in Scandinavia (south), central Europe, Caucasus, and in North America. It has been found in nests of carder-bees, ants, birds, and mice, and under vegetable refuse, often in great numbers.

SILPHIDÆ

Calyptomerus dubius, Marsh.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Ballyvoy and Whitepark Bay, Cs. & T.).—Dublin (Malahide, '54 Hn.; Portmarnock, Ht.).—Waterford ('78 P.).—Cork (Kanturk, '47 W. 1).

Clambus armadillo, De G.

ULSTER. LEINSTER.

Donegal (Foyle dist., B.).—Down (near Belfast, '85 H.).—Armagh ('90 J. 1)—Dublin ('54 Hn.).—Carlow (Borris, '95 Ht. 8).

Common where it occurs.

Agathidium nigripenne, Kug.

ULSTER. CONNAUGHT.

Donegal (Foyle dist., '00 B.; Rathmullan, '91 F. 1, coll. Wr.).—Armagh (J.).—Mayo (Westport, '91 F. 1, coll. Wr.).

Under bark, rare.

A. lævigatum, Er.

ULSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Ballycastle, T.).—Armagh ('88 J. 2).—Monaghan (Scotstown, J.).—Limerick (H. MS.).

A. marginatum, Sturm.

LEINSTER. MUNSTER.

Dublin (Portmarnock, '55 H. 1).

There is a specimen of this species in the Haliday collection labelled "S. Ireland T. V. W." (T. V. Wollaston). In the first reference Haliday mentions having taken it in other parts of the country.

A. varians, Beck.

ULSTER.

Antrim (Belfast dist., Ht., coll. B.).

A. convexum, Sharp.

ULSTER.

Antrim (Hanging Wood, Ballycastle, Ht., coll. Cs.).

A single specimen found in moss, September, 1901.

A. rotundatum, Gyll.

ULSTER.

Antrim (Murlough, Ht., coll. Cs.).—Armagh (92 J. 4; Coney Island, Lough Neagh, J.).—Fermanagh (Belleisle, '98 Pr.).

Amphicyllis globus, F.

LEINSTER.

Kilkenny (Thomastown, Ht.).

A specimen taken by sweeping in a marshy place on the banks of the Nore, July, 1901.

Liodes humeralis, Kug.

LEINSTER. MUNSTER.

Westmeath (Lough Derravaragh, in fungi on tree trunks, Ht.).—Wicklow ('98 Ht. 4, H. coll.).—Kerry (Kenmare, '98 Ht. 4, coll. Hr.).

Anisotoma cinnamomea, Er.

ULSTER.

Down (near Belfast, '85 H.).

Requires confirmation as an Irish species. There are specimens of *A. calcarata*, Er., in the Haliday collection labelled *picum* (synonym of above). Prof. M'Nab includes *A. cinnamomea* in the Dublin list apparently on the strength of the *A. picea*, Ill., in the reference ('54 Hn.): very possibly there has been some confusion in these records.

A. dubia, Kug.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Buncrana, '95 Wr.; Ardara, J.).—Antrim (Ballycastle, Cs. & T.).—Galway (Roundstone and Inish MacDara, Ht.).—Roscommon (bank of the R. Suck, Ch., coll. Ht.).—Dublin (Portmarnock, '54 Hn.; Tallaght, Ht.).—Wicklow (Arklow sands, Fg. MS.).—Cork (Kanturk, '47 W. 1).

A. ovalis, Schmidt.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Ardara, J.).—Antrim (Lagan Canal near Belfast, Ch., coll. B.).—Armagh (Ch., coll. J.).—Roscommon (Athleague, Ht., coll. Nc.).—Wexford (Ch., coll. Ht.).—Waterford (Glenshelane Valley, Ch., coll. Ht.).—Ireland (H. coll.).

A. punctulata, Gyll.

ULSTER. LEINSTER.

Donegal (Coolmore, '94 J. Ht. Cr.).—Dublin ('54 Hn., recorded as *pallens*, Ste.).—Ireland (Ch., H. coll.).

A. calcarata, Er.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Sligo, Dublin, Waterford, Cork, Kerry.

A. nigrita, Schmidt.

Ireland (H. coll.).

A specimen in the Haliday collection, has been queried as a small pallid variety of this species by Mr. G. C. Champion. The record, Armagh ('91 J. 3), [is to be deleted.

A. parvula, Sahl.

ULSTER. LEINSTER.

Armagh (J.).—Kilkenny (Thomastown, Ht.).

The record, Santry ('93 Ht. 3), should refer to *C. dentipes*, Gyll.

Colenis dentipes, Gyll.

ULSTER. LEINSTER.

Down (near Belfast, '85 H.).—Dublin ('54 Hn.; Santry, Ht.).

Necrophorus humator, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

N. mortuorum, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B. ; Ardara, '92 J. 3).—Down (near Belfast, '85 H. ; Tollymore Park, Fg. MS. ; Slieve Croob, '38 Pn.).—Fermanagh (Tempo, L.).—Galway (Clonbrock, '96 Ht. 2).—Dublin, '54 Hn. ; Tibbradden, '94 Ht. 3).—Wicklow (Devil's Glen, July 6, in a dead hedgehog, H. MS.).—Clare (Cratloe Wood, Ht.).

Locally common.

N. ruspator, Er.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. The variety *microcephalus*, Thoms., has been recorded from Donegal and Derry (Foyle dist., '00 B. ; Ardara, '92 J. 3). Cork (Rosscarbery, '95 C. 1), and no doubt occurs in most localities.

N. vespillo, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim, Down, Armagh, Roscommon, Galway, Louth, Dublin, Waterford, Cork.

Not so common as the preceding.

Necrodes littoralis, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Fermanagh, Galway, Dublin, Limerick, Cork, Kerry.

Not common though widespread round the coast, rarer inland.

Silpha tristis, Ill.

LEINSTER. MUNSTER.

Dublin (Portmarnock, Fg. coll.).—Limerick (Bk.).—Waterford (Ht., coll. Tp.).

S. nigrita, Creutz.

ULSTER.

Donegal (Glenties, Ht., coll. Fn.).—Antrim (Rathlin Island, '97 Hr. ; Belfast, J.) Ireland (H. coll.).

A northern species in Britain. On the Continent it is found chiefly in alpine districts.

[*S. obscura*, L. The record, Belfast ('89 J. 4), is to be referred to the preceding species.]

***S. quadripunctata*, L.**

ULSTER. LEINSTER. MUNSTER.

Down (Rostrevor, Fg. MS.).—Wicklow (The Dargle, '54 Hn.).—Carlow (Borris, Ht., coll. Freke).—Clare (Cratloe Wood, '99 N.).—Waterford (Glenshelane Valley, Ht.).

Very local on forest trees. The Irish specimens were found on oak, mountain ash, and alder. Distribution—northern and central Europe, Siberia. According to Ganglbauer it is found chiefly in oak forests, preying on lepidopterous larvæ.

***S. opaca*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Fairly common throughout the country, occurring on the Blaskets off the Kerry coast, and often on mountain summits. For injury caused to mangold roots by this species see ('97 Cr.).

***S. rugosa*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***S. sinuata*, F.**

Although this is a common insect in Great Britain, it requires confirmation as an Irish species. Haliday records it from Belfast ('85 H.), but from notes in his MS. list of Irish beetles, there would seem to have been some confusion between this and the following species. The records, Shane's Castle ('85 Pn.); Lough Neagh ('88 J. 2); Armagh ('92 J. 4); are to be referred to *S. dispar*, Herbst.

***S. dispar*, Herbst.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Shanes Castle, Lough Neagh, Pn.).—Armagh (Lough Neagh, '88 J. 2; Armagh, '92 J. 4).—Roscommon (Lough Ree, '98 Ht. 1).—Galway (banks of the Suck near Clonbrock, '96 Ht. 2).—Dublin (Portmarnock sands, Fg. coll.).—Clare (shore of Lough Derg, Sp.).

Very local, under stones and refuse near lakes and rivers. The most numerous capture was at Derryadd, Lough Neagh, where it was

found in water weeds mixed with fish scales cast up on the lake shore. This species has been recorded from Scotland (Solway, Forth, and Moray districts), north of England, and Wales. Abroad it occurs over northern and central Europe, and in Siberia.

S. atrata, L., var. SUBROTUNDATA, Steph.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. The question has been raised as to whether typical *S. atrata* occurs in Ireland. Mr. J. J. Walker considers that specimens taken by him in various parts of Ireland are indistinguishable from English *atrata*, but as he did not keep a collection, at the time, most of these specimens are not now available for reference. On the other hand we have never met with typical *S. atrata* in Ireland, and in this experience we are supported by Messrs. G. A. Lewcock and W. E. Sharp, both of whom have investigated the question with great care. Dr. Power recording the results of a collecting tour in the south-east of Ireland says, "every specimen I saw of *Silpha* was undoubtedly *subrotundata*" ('78 P.). The chief points of difference are as follows:—*S. subrotundata* is on an average larger than *S. atrata*; it is broader in proportion to its length, less parallel sided, and the disc of the thorax is as a rule less closely punctured. The reflexed margin of the elytra is very strongly developed, and extends almost to the apex, while in the type the margin is much feebler and scarcely reaches beyond the middle of the elytra. The supposed difference in the length of the central raised line on the elytra is not to be relied on as a distinction. In colour *S. subrotundata* may be either brown or black, both forms occurring indiscriminately under stones, loose bark, and in moss. There do not seem to be any satisfactory records of the var. *subrotundata* from either England, Scotland, or the Continent. Consequently we have good ground for believing it to be confined to Ireland, and the Isle of Man, where it is said to be common. As regards the variety *brunnea*, Herbst., we have no records of its occurrence in Ireland. The records of *S. atrata* in the references ('54 Hn.; '93 D.N.F.C.; '95 Wr.; '97 Hr., are to be referred to the variety *S. subrotundata*, Steph.

Choleva angustata, F.

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Dublin ('54 Hn.).—Kerry (Carran-tuohill, '99 Sch. & Cr.).

Very rare.

***C. cisteloides*, Fröhl.**

ULSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Armagh (J.).—Kerry (Ballybunion, '96 C.).

The record, Bundoran ('91 J. 1), is to be deleted.

[*C. spadicea*, Sturm. Armagh ('89 J. 5). This record must be applied to *C. grandicollis*, Er.]

***C. agilis*, Ill.**

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Ballycastle, Ht., coll. Wl.; Dunluce; Woodburn Glen, '95 Ht. 4).—Down (near Belfast, '85 H.; Bangor, '95 Wr.).—Armagh ('90 J. 1).—Fermanagh (Belleisle, '98 Pr.).—Dublin (Tibradden, '95 Ht. 3).—Clare (Lahinch, Ht., coll. Gr.).

Under moss and leaves in damp situations.

***C. velox*, Spence.**

ULSTER.

Antrim (Ballycastle, Cs.).—Armagh ('92 J. 4).—Fermanagh (Tempo, coll. Sch.).

Rare.

***C. Wilkini*, Spence.**

ULSTER. LEINSTER.

Armagh ('89 J. 4; Loughall, J.).—Wicklow ('00 Ht. 3).

In fungi and rotten wood.

***C. fusca*, Panz.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Down, Meath, Dublin, Wicklow, Wexford, Waterford, Kerry.

Not uncommon.

***C. nigricans*, Spence.**

ULSTER.

Antrim (Rathlin Island, '97 Hr.).

Found in numbers on a dried rabbit skin by Mr. J. R. Hardy.

C. longula*, Kell.*MUNSTER.**

Waterford ('78 P.).

C. morio*, F.*ULSTER. LEINSTER.**

Donegal (Foyle dist., '00 B.; Portsalon, Sn.; Bundoran, '91 J. 1).—Derry (Magilligan, Ht., coll. B.).—Dublin (Dodder banks; Portmarnock, '54 Hn.).

The record, Armagh ('88 J. 5), is to be deleted.

C. grandicollis*, Er.*ULSTER. LEINSTER. MUNSTER.**

Donegal (Foyle dist., '00 B.; Bundoran, J.).—Antrim (Murlough, Cs.).—Armagh ('92 J. 4).—Dublin (Donabate, '95 Ht. 3; Portmarnock, Ht.).—Clare (Finlough, Ht.).—Kerry (Kenmare, '98 Ht. 4).

This species is common on the Dublin sandhills, under dead rabbits.

C. nigrita*, Er.*ULSTER. LEINSTER.**

Antrim (Cushendun, '90 J. 2).—Meath (Laytown sandhills, '00 Ht. 3).

C. tristis*, Panz.*ULSTER. LEINSTER. MUNSTER.**

Donegal, Derry, Antrim, Down, Dublin, Wicklow, Wexford, Waterford, Kerry.

Common.

C. chrysomeloides*, Panz.*ULSTER.**

Donegal (Foyle dist., '00 B.).—Antrim (Lough Neagh, H. coll.).

Rare; in fungi and carrion. The record, Armagh ('90 J. 1), is to be deleted.

C. fumata*, Spence.*CONNAUGHT.**

Galway (Clonbrock, '96 Ht. 2).

Common in dead birds, in woods.

C. Watsoni, Spence.

ULSTER. CONNAUGHT. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Bundoran, J.).—Antrim (Ballycastle, Cs.).—Armagh (J.).—Roscommon (Mote Park, '98 Ht. 1).—Waterford ('78 P.).—Kerry (Ballybunion, '98 C.; Kenmare, '98 Ht. 4).

Common where found.

Ptomaphagus sericeus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Down, Armagh, Sligo, Dublin, Cork, Kerry.

Colon serripes, Sahl.

ULSTER.

Donegal (Foyle dist., '00 B.).—Down (" *Mylæchus fuscus*, Er., Clifden, June 20th, 1840, on a fir tree," H. MS.).—Armagh (Lough Gilly, coll. J.).—Ireland ('55 H. 1).

Rare; found in damp moss and by sweeping rushes. The Donegal and Armagh specimens were identified by Mr. G. C. Champion.

[*C. viennense*, Herbst. The record, Armagh ('92 J. 4), is to be referred to *C. serripes*, Sahl.]

C. angulare, Er.

ULSTER.

Donegal (Foyle dist., '00 B., named by Ch.).—Ireland (H. coll.)

Taken by sweeping rushes. A specimen in the Haliday collection is referable to the variety *rectangulum*, Chaud.

C. dentipes, Sahl.

ULSTER. LEINSTER.

Down (" Clifden, June," H. MS.).—Dublin ('78 P.).—Ireland ('55 H. 1).

Described as a new species (*C. spinipes*) by Mr. A. H. Haliday ('41 H. 2), but subsequently admitted to be synonymous with *dentipes*, Sahl. ('55 H. 1).

C. brunneum, Latr.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B., named by Ch.).—Down (Holywood, '41 H. 2; on an oak, H. Diary).—Galway (Eyre court, '41 H. 2).—Wicklow and Cork ('55 H. 1).

"June and July, rare" (H.).

C. appendiculatum, Sahl.

ULSTER.

Down (Holywood, once in July, '41 H. 2).—Ireland ('55 H. 1).

C. calcaratum, Er.

ULSTER.

Down ("Clifden, July," H. MS.).—Ireland ('55 H. 1).

HISTERIDÆ.**Hister unicolor**, L.

ULSTER.

Down (near Belfast, '85 H.).

The Belfast specimens cannot be traced.

H. cadaverinus, Hoff.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Roscommon, Galway, Dublin, Waterford.
Locally common.

H. purpurascens, Herbst.

ULSTER. CONNAUGHT. LEINSTER.

Down (near Belfast, '85 H.).—Galway (Kilkieran Bay, Wr.).—Dublin ('54 Hn.; North Bull, var. *niger*, Er., '00 Ht. 3).—Ireland (type form, H. coll.).

Rare.

H. neglectus, Germ.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim (Rathlin, &c.), Down, Armagh, Fermanagh, Sligo, Roscommon, Galway, Dublin, Wicklow, Carlow, Clare, Kerry (Valentia, Kenmare, &c.).

Frequent. It is remarkable that this species is commoner in Ireland than its ally *H. carbonarius*, Ill., while the reverse is the case in England.

***H. carbonarius*, Ill.**

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Armagh ('92 J. 4).—Dublin ('54 Hn.).—Queen's County (Abbeyleix, Bn.).—Waterford ('78 P.).—Cork (Bn.; Queenstown, '95 Wr.).—Kerry (Kenmare, '98 Ht. 4).

Local, but probably of wider range than these records indicate. The record, Mote Park ('98 Ht. 1), should read *H. cadavarinus*, Hoff.

***H. xii-striatus*, Schr.**

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Dublin (Dundrum, '00 Ht. 3).—Kerry (Kenmare, '98 Ht. 4).

Common where it occurs.

***H. bimaeculatus*, L.**

ULSTER. LEINSTER.

Donegal (Portsalon, Sn.).—Derry (taken floating in River Faughan, '00 B.).—Dublin (Hume Street, '54 Hn.; Dundrum, '00 Ht. 3).—Wicklow (Ashford, Fg. coll.).

Rare, most of the captures being of single specimens.

***Gnathonus nannetensis*, Mars.**

LEINSTER.

Dublin (Portmarnock, '54 Hn.).

Saprinus rotundatus of this reference.

***Saprinus nitidulus*, Payk.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster, also in the counties of Sligo, Roscommon, Galway, Dublin, Queen's County, Cork, Kerry.

***S. æneus*, F.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Down, Dublin, Clare, Waterford, Kerry.

Common—and like the preceding commonest on the sea coast.

S. quadristriatus, Hoff.

ULSTER.

Antrim (Portballintrae, '94 T.; Whitepark Bay, Cs.).
One specimen found on the sandhills at Bush Bay.

S. rugifrons, Payk.

ULSTER.

Antrim (Cushendun, '90 J. 2—specimens cannot be traced).

S. maritimus, Steph.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (Newcastle, Ch.).—Sligo (Enniscrone, J.).—Meath (Laytown, '94, D.N.F.C.).—Dublin (Portmarnock, Fg. MS.; North Bull, &c. '00 Ht. 3).—Wicklow (Kilcool, '00 Ht. 3; Arklow, Fg. MS.).—Wexford (Courtown, '93 C. 4).—Waterford (Tramore, Fg. MS.).—Kerry (Kenmare, '98 Ht. 4).

Locally common on the coast.

Acritus minutus, Herbst.

ULSTER. LEINSTER.

Down (Holywood, common in hot-bed frames, H. MS.).—Armagh ('91 J. 2.).—Dublin (Dundrum, '00 Ht. 3).

Found in numbers in a hot-bed at Armagh. According to a note in the Haliday MS., the Holywood specimens are the present species not *A. globosus* as recorded in ('85 H.).

Onthophilus striatus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

SCAPHIDIIDÆ.**Scaphisoma agaricinum, L.**

ULSTER. CONNAUGHT. LEINSTER.

Armagh (Lowry's Lough, '92 J. 2.).—Galway (Woodford, Ht.).—Westmeath (Derravaragh, Ht.).—Dublin ('78 P.; Woodlands, '94 Ht. 3).

In rotting wood and fungi.

S. boleti, Panz.

CONNAUGHT. LEINSTER.

Galway (Clonbrock, Ht., coll. D.).—Dublin (Dundrum, '95 Ht. 3).

TRICHOPTERYGIDÆ.

Actinopteryx fuscicola, All. (*T. mollis*, Hal.).

Ireland ('55 H. 1).

"Inhabits sandy sea-coasts, rather rare." The synonyms quoted in this family, are the names under which the species were recorded by Haliday ('55 H. 1).

Trichopteryx atomaria, De G.

ULSTER. LEINSTER. MUNSTER.

Down (Holywood, '92 J. 5).—Armagh ('92 J. 4).—Wicklow and Cork, &c. (rare amongst lichens, '55 H. 1).

In moss and vegetable refuse.

T. grandicollis, Mann.

LEINSTER.

Dublin ('54 Hn.).—Wicklow ('55 H. 1).

T. lata, Mots.

ULSTER.

Armagh (Poyntzpass, '97 J. 3).

T. fasciularis, Herbst.

LEINSTER.

Dublin (dist., '54 Hn.).

"Very abundant about dunghills and in pastures" ('55 H. 1).

T. sericans, Heer.

LEINSTER.

Dublin (dist., '54 Hn.).

"Not rare with the last"—*Nephanea titan*, Newm.—('55 H. 1).

T. brevipennis, Er.

ULSTER.

Armagh ('92 J. 4).

T. Chevrolati, All. (*T. pygmaea*, Hal.)

Ireland (rare, '55 H. 1).

T. suffocata, Hal.**MUNSTER.**

Cork (Glen-na-Chatta, Shournagh River, '55 H. 1).

"Found in October, the larva and perfect insect together, under damp fallen leaves on stones, in the bed of a dried-up brook. When alive, the elongated form, somewhat like a *Hypocyrtus*, was very striking."

Nephanea Titan, Newm. (*T. curta*, Hal.).

LEINSTER.

Dublin (dist., '54 Hn.).

"Not rare about farm-yards" ('55 H. 1).

Ptilium Kunzei, Heer.**LEINSTER.**

Dublin (dist., '54 Hn.).

"Not rare about farm-yards" ('55 H. 1).

P. Spencei, All. (*P. angustatum*, Hal.)

Ireland (rare, '55 H. 1).

P. foveolatum, All. (*T. clandestinum*, Hal.)**ULSTER.**

Down (Holywood, '55 H. 1).

"Taken at Holywood. Seems to be very rare, but from its extreme minuteness and pale colour may easily escape observation."

Actidium coarctatum, Hal.**ULSTER.**

Donegal (under stones by the Calry River, '00 B.).—Down (Rare in a farm-yard at Holywood, '55 H. 1).

Nossidium pilosellum, Marsh.

Ireland (very rare, on rotten stumps, '55 H. 1).

Ptenidium punctatum, Gyll.**ULSTER. LEINSTER.**

Donegal and Derry (Foyle dist., '00 B.; Buncrana, '95 Wr.).—Dublin (sea coast, '54 Hn.; Donabate, Ht.).

"Common about dunghills; also on *fuci* and *zostera*, drying on the shore" ('55 H. 1).

***P. fuscicornis*, Er.**

ULSTER.

Armagh ('92 J. 4).

***P. nitidum*, Heer. (*P. pusillum*, Hal.)**

ULSTER. LEINSTER. MUNSTER.

Down (Holywood, J.).—Armagh ('92 J. 4).—Dublin (Malahide, '54 Hn.).—Cork (Kanturk, '47 W. 1).—Ireland (not rare, '55 H. 1).

***P. evanescens*, Marsh. (*P. apicalis*, Hal.)**

ULSTER. LEINSTER.

Antrim (Ballycastle, T.).—Down (Holywood, J.).—Armagh ('92 J. 4; Poyntzpass, '97 J. 3).—Dublin ('54 Hn.; Dundrum, Ch. coll. Bk.).
"Common about dunghills, and among fallen leaves". ('55 H. 1).

CORYLOPHIDÆ.

***Orthoperus brunnipes*, Gyll.**

Ireland ("south, T. V. W." H. MS.).

Wollaston records *Orthoperus nigrescens* from Kanturk ('47 W. 1), which, according to Waterhouse's catalogue, is a synonym for the following species. However, the above record is inserted, without query, in Haliday's MS. list.

***O. stomus*, Gyll.**

ULSTER. CONNAUGHT. MUNSTER.

Down (Holywood, H. MS.).—Galway (H. MS.).—Waterford ('78 P.).—Cork (Kanturk, '47 W. 1).—Ireland (H. coll.).

***Corylophus cassidioides*, Marsh.**

ULSTER. LEINSTER.

Down (Holywood, H. MS.; '85 H.).—Dublin (Malahide, '54 Hn.).
A specimen from Malahide is in the Haliday collection.

***C. sublævipennis*, Duv.**

LEINSTER.

Dublin (Portmarnock, '00 Ht. 3).

A single specimen taken on the sandhills.

Sericoderus lateralis, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.; Clifden, H. MS.).—Galway (Woodford, Ht.).—Dublin (Templeogue and Dundrum, '00 Ht. 3; Portmarnock, Ht.).—Wicklow (Ashford, Fg. MS.).—Waterford ('78 P.).

Local; in fungi.

COCCINELLIDÆ.**Subcoccinella xxiv-punctata**, L.

ULSTER.

Antrim (Cliffs between Whitehead and Blackhead, Ht., coll. B.).
Two specimens found in tufts of grass on the cliffs.

Hippodamia xiii-punctata, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Cranmore, '85 Pn.).—Down (near Belfast, '85 H.).—Armagh ('88 J. 2; Churchill, J.).—Roscommon (Mote Park, '98 Ht. 1).—Galway (Clonbrock, '98 Ht. 1).—Dublin (Portmarnock, on willows, '64 Hn.; Woodlands, '94 Ht. 3).—Waterford (Lismore, Ht.).—Kerry (Milltown, in plenty on *Aster*, '55 Hn. 2).

Local, and usually taken singly.

Anisosticta xix-punctata, L.

MUNSTER.

Kerry (Kenmare, '98 Ht. 4).

Taken by Mr. H. G. Cuthbert in Kenmare Wood, July, 1898.

Adalia obliterata, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Armagh, Fermanagh, Cavan, Galway, Westmeath, Dublin, Wicklow, Wexford, Waterford.

Common in fir plantations.

A. bipunctata, L.

MUNSTER.

Waterford (coll. Nl.).

***Mysia oblongoguttata*, L.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal (J.).—Armagh (Churchill, '88 J. 2).—Galway (Clonbrock, '98 Ht. 1).—Dublin ('92 Br.; Lucan, '94 Ht. 1; Santry, Ht.).—Wicklow (Bray Head, '94 Ht. 1).

Mostly found on fir trees, not common.

***Anatis ocellata*, L.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle), Armagh, Fermanagh (Tempo), Dublin (Lucan, Tolka Valley, Dublin Mountains), Wicklow (Bray, &c.), Waterford.

On fir trees and in moss, not common.

***Coccinella x-punctata*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, and extremely variable. A form with confluent elytral spots (var. *decompustulata*, L.) is not uncommon, and a variety with black elytra, and a pale spot on the humeral angles (var. *bimaculata*, Pontopp), has been found in the Foyle district.

***C. hieroglyphica*, L.**

ULSTER. CONNAUGHT. MUNSTER.

Donegal, Derry, Armagh, Fermanagh, Roscommon, Galway, Waterford, Cork, Kerry.

Frequent on heaths.

***C. xi-punctata*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, especially on sandhills.

***C. vii-punctata*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*Halysia xii-guttata*, Poda. Belfast ('91 F. 1). This record is probably due to some confusion of synonymy, as the species is not mentioned in Haliday's Belfast list ('85 H.)].

Halysia xvi-guttata, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Rathmullan, Wr.).—Fermanagh (Belleisle, '98 Pr.).—Sligo (Lough Gill, J.).—Mayo (Westport, '71 S.).—Galway (Oughterard, '95 Ht. 6).—Dublin (Lucan Demesne, 94 Ht. 3).—Wicklow (Arklow, Fg. MS.; Glenmalur Wood, '96 Ht. 7).—Carlow (Borris, '95 Ht. 5).—Wexford (Ht.).—Clare (Lahinch, Gr.).—Waterford (Cappoquin, Ht.).—Kerry (Kenmare, '98 Ht. 4).

Local in wooded districts.

H. xiv-guttata, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

H. xviii-guttata, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Cavan, Galway, Dublin, Queen's County, Cork, Kerry.

Widely distributed, but not common.

H. conglobata, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster, Sligo, Mayo, Roscommon, Galway, Westmeath, Dublin, Wicklow, Carlow, Kilkenny, Wexford, Clare, Limerick, Waterford, Cork, Kerry.

Occurs on heaths and river banks, especially on willows.

H. xxii-punctata, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster and Leinster, but apparently rarer westward, as the only records we have from the remaining provinces are Galway and Waterford.

Hyperaspis reppensis, Herbst.

ULSTER.

Donegal (Coolmore, '95 J. 1).—Derry (Culmore and Kilderry, '00 B.).

Found on the beach at Coolmore after a high wind.

***Scymnus Redtenbacheri*, Muls.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Armagh, Galway, Louth, Dublin, Carlow, Waterford.

Common.

***S. suturalis*, Thunb.**

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Dublin (Portmarnock, '54 Hn.).—Waterford ("limbatus, Steph." '78 P.).

The records, Armagh ('92 J. 4; '89 J. 1), should refer to *S. Redtenbacheri*, Muls.

***S. testaceus*, Mots.**

ULSTER.

Antrim (Gortconny Bog, near Ballintoy, in moss, Cs. & T., *Irish Nat.* xi., p. 63). "The specimens appear to be referable to this species. They present great variation in colour, some having the elytra wholly yellowish-brown, whilst in others this colour is limited to a small spot on each elytron." The records, Armagh ('88 J. 2); Braganstown ('95 Ht. 7); Borris ('95 Ht. 8), are to be referred to *S. Redtenbacheri*, Muls.

***Chilocorus bipustulatus*, Ill.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Armagh (Churchill, '95 J. 2).—Mayo (Lough Mask, Ht.).—Roscommon (Lough Ree and Mote Park, '98 Ht. 1).—Galway (Oughterard, '95 Ht. 6; Clonbrock, '96 Ht. 2; Woodford, Ht.).—King's County (Clonmacnoise, '00 Ht. 1).—Wexford (marsh by the Slaney estuary, Ht.).—Clare and Limerick (Ht.).—Cork (Rosscarbery, '95 C. 1; Monkstown, coll. Ws.).

Rather common on willows, &c., on boggy heaths in the south and west, but rare in the province of Leinster.

***Rhizobius lutura*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Coccidula rufa*, Herbst.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

ENDOMYCHIDÆ.***Mycetæa hirta*, Marsh.**

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Dublin ('54 Hn.).—Waterford ('78 P.).—Kerry (Valentia, '98 Ht. 3).

Rare in moss.

***Triplax ænea*, Schall.**

This species is marked as "certainly Irish" in Haliday's MS. list. It would seem to have been one of the late J. Tardy's captures, but the specimens cannot be traced.

PHALACRIDÆ.***Phalacrus substriatus*, Gyll.**

CONNAUGHT.

Galway (Clonbrock, '96 Ht. 2).

***P. caricis*, Sturm.**

ULSTER. LEINSTER.

Armagh (Lowry's Lough, J.).—Louth (Braganstown, '95 Ht. 7).

***Olibrus corticalis*, Panz.**

LEINSTER.

Dublin (taken by Miss M. Ball, '54 Hn.).

***O. æneus*, F.**

ULSTER. LEINSTER. MUNSTER.

Down (Belfast, H.).—Dublin (Dodder banks, '54 Hn.; Baldoyle, Ht.).—Wexford (coast, Ht.; Courtown, '92 C. 6).—Waterford ('78 P.; Tramore, Ht.).

***O. bicolor*, F.**

LEINSTER. MUNSTER.

Kilkenny (Thomastown, Ht.).—Wexford (Ardcavan and Rosslare sands, Ht.).—Waterford (Tramore, Ht.).—Cork (Middleton, '95 Wr.; Berehaven, Wr.).—Kerry (Valentia, '98 Ht. 3).

Common in the south-east.

MICROPELIDÆ.

***Micropeplus porcatus*, Payk.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Dublin, Kerry.

***M. staphylinoides*, Marsh.**

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Armagh ('92 J. 4).—Dublin (Portmarnock, '54 Hn.).—Cork (Kanturk, '47 W. 1).

Rare; in moss.

***M. margaritæ*, Duv.**

ULSTER. LEINSTER. MUNSTER.

Derry (Foyle dist., '00 B.).—Down (Bangor, '95 Wr.).—Dublin (Dodder banks, H, coll.).—Cork (Middleton, '95 Wr.).

***M. tesseraula*, Curt.**

ULSTER.

Derry (Culmore, '00 B.).—Down (Holywood, '39 Curtis; '41 H. 1).

"Taken out of a pond in a marsh near Belfast early in February, 1827." ('41 H. 1). This would seem to be a rare species generally; it has been recorded from northern and central Europe, Algeria, Siberia, Caucasus, and in North America.

NITIDULIDÆ.

***Brachypterus pubescens*, Er.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster. It has also been taken in the counties of Sligo Louth, Westmeath, Dublin, Wexford, Limerick, Kerry.

***B. urticæ*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Cercus pedicularius*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Armagh, Fermanagh, Roscommon, Galway, Westmeath, Dublin, Clare, Limerick.

***C. bipustulatus*, Payk.**

CONNAUGHT. LEINSTER.

Roscommon (Mote Park, '98 Ht. 1).—Westmeath (Knockdrin near Mullingar, Ht.).

Very local, on *Spiræa* in marshy places.

***C. rufilabris*, Latr.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Armagh, Galway, Louth, Westmeath, Kilkenny, Clare, Limerick, Kerry.

***Carpophilus hemipterus*, L.**

LEINSTER. MUNSTER.

Dublin (Charlton, Roebuck, in rotten wood, '56 Hn. 1).—Limerick (Bk.).

***Epuraea sestia*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***E. melina*, Er.**

ULSTER. MUNSTER.

Down (Bangor, '95 Wr.).—Waterford ('78 P.).—Cork (Queens-town, '95 Wr.).

[*E. silacea*, Er. Haliday queries this species in his MS. Irish list, so that the old Dublin record under ('54 Hn.) should probably refer to some other species.]

***E. oblonga*, Herbst.**

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B).—Dublin ('54 Hn.).

***E. longula*, Er.**

ULSTER. CONNAUGHT.

Donegal (Foyle dist., '00 B).—Galway (Clonbrock, coll. D.).

***E. florea*, Er.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Antrim (Ballycastle), Down, Armagh, Fermanagh, Louth, Dublin, Wexford, Waterford,

Probably common, but there are few records.

***E. deleta*, Er.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (Comber, B.).—Armagh (J.).—Roscommon (Mote Park, '98 Ht. 1).—Galway (Clonbrock, '96 Ht. 2).—Westmeath (Mullingar dist., Ht.).—Dublin ('00 Ht. 3).—Clare and Limerick (Ht.).—Waterford ('78 P.).

Locally common in fungi.

***E. obsoleta*, F.**

ULSTER.

Donegal (Kilderry, '00 B.).—Down (Castlewellan, '85 Pn.).

Mr. C. W. Buckle's specimens were taken by beating ivy.

***E. pusilla*, Er.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Foyle dist., '00 B.).—Galway (Tuam, Ht.).—Dublin ('54 Hn.).

Under fir bark.

***E. angustula*, Er.**

ULSTER.

Donegal (Glentocher, '00 B.).

Three examples of this rare species were taken in the borings of *Trypodendron domesticum* in a fallen beech tree. Distribution—northern and central Europe. Very rare in Great Britain, occurring chiefly in the north, often in the burrows of *Xyloterus lineatus* in Scotch fir.

***Nitidula bipustulata*, L.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Down (near Belfast, '85 H.).—Dublin (local, '54 Hn.).—Wicklow (Kilcool, on the shore, Ht.).—Limerick (in a dead stoat, N.).

Seronia punctatissima, Ill.

There is an Irish-taken example of this insect in the Dublin Museum, which had been for many years in the Trinity College collection.

S. grisea, L.

ULSTER. CONNAUGHT. LEINSTER.

Down (near Belfast, '85 H.; Cranmore, near Belfast, J., coll. Tn.).—Galway (Wr.).—Dublin (Dundrum, Bk.).—Wicklow (Kilruddery, &c., on bones, '54 Hn.).

Omosita depressa, L.

ULSTER. LEINSTER.

Down (near Belfast, '85 H.).—Wicklow (Kilruddery, &c., under bones, '54 Hn.).

O. colon, L.

ULSTER. LEINSTER.

Down (near Belfast, '85 H.; Ardglass, J.).—Dublin (Portmarnock, '00 Ht. 3; Dundrum, Bk.).

O. discoidea, F.

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Dublin (Dundrum, '95 Ht. 3).—Wicklow (Kilruddery, &c., on bones, '54 Hn.).—Cork (Queenstown, '95 Wr.).

[*Thalycra sericea*, Sturm. The record, Glencullen ('92 C. 4), is to be deleted.]

Pocadius ferrugineus, F.

CONNAUGHT. LEINSTER. MUNSTER.

Galway (Woodford, Ht.).—Louth (Clogher Head, '00 Ht. 3, coll. C.).—Westmeath (Derravaragh, Ht.).—Dublin (Dundrum, '00 'Ht. 3).—Clare (Glenomeragh, Ht.).

Locally common in Lycopodons and other fungi, especially those growing on decaying tree trunks.

Meligethes rufipes, Gyll.

ULSTER. CONNAUGHT.

Down (near Belfast, '85 H.).—Galway (Aranmore, '95 Ht. 6).

***M. lumbaris*, Sturm.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Armagh ('92 J. 4).—Dublin ('00 Ht. 3).—Galway (Woodford, Ht.).—Kilkenny (Thomastown, Ht.).—Wexford (Killoughrum, Forth Hills, &c., Ht.).—Clare (South, Ht.).—Waterford (Cappoquin, Ht.).
Common in the south-east.

***M. seneus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. The var. *caeruleus*, Steph., occurs.

***M. viridescens*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, and variable in colour.

[*M. viduatus*, Sturm. The records, Bundoran ('91 J. 1), Ardara ('92 J. 3), and Armagh ('92 J. 4), are to be deleted.]

***M. pedicularius*, Gyll.**

LEINSTER. MUNSTER.

Dublin ('54 Hn.).—Waterford ('91 F. 1; Lismore, Ch., coll. Ht.).—Ireland (H. coll.).

***M. ovatus*, Sturm.**

LEINSTER.

Wexford (Courtown, Ht.).

A specimen taken by sweeping on the sandhills in May, 1899, has been verified by Mr. G. C. Champion.

[*M. flavipes*, Sturm. The record, Armagh ('92 J. 4), is to be referred to *M. picipes*, Sturm.]

***M. picipes*, Sturm.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Roscommon, Westmeath, Dublin, Kilkenny, Wexford, Waterford, Cork, Kerry.

Common in woods.

***M. obscurus*, Er.**

CONNAUGHT. LEINSTER. MUNSTER.

Galway (Boundstone, Ht.).—Dublin (Howth, J.).—Wicklow (Avondale, '00 Ht. 3).—Wexford (Killurin, Ht.).—Waterford (Trimore, Ht.).—Cork (Glandore, Ht.).—Kerry (Kenmare, '98 Ht. 4).

M. erythropus, Gyll.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Armagh (Ch., coll. J.).—Dublin (North Bull, '00 Ht. 3).—Wexford (Ferns, '97 D.N.F.C.; Courtown, Killoughrum, Ardavan, &c., Ht.).—Waterford (Tramore Ht.).

Cychramus luteus, F.

ULSTER. CONNAUGHT. LEINSTER.

Antrim (Ballycastle, common in fungi, Ca.). Down (Rostrevor, on whitethorn, Fg. coll.; var. *fungicola*, '98 Ht. 1; Tollymore Park, var. *fungicola*, H. MS. and '00 J. 4).—Galway (Clonbrock, var. *fungicola*, '98 Ht. 1).—Dublin (local, '54 Hn.).—Wicklow (Ovoca, var. *fungicola*, '00 Ht. 3).—Queen's County (Abbeyleix, var. *fungicola*, '01 Bn.).—Kilkenny (Woodstock, Ht.).

Local. The var. *fungicola*, Heer., is not uncommon, occurring chiefly in fungi in wooded districts.

Ips quadripustulata, L.

ULSTER.

Tyrone (Dungannon, H. MS.).

Referring to the Belfast record ('85 H.) of this species Mr. S. A. Stewart says, "The mark placed by Mr. Haliday opposite this name has been blotted, and there is some doubt as to what was intended."

Pityophagus ferrugineus, F.

CONNAUGHT. LEINSTER. MUNSTER.

Galway (Tuam, '95 Cr. 1).—Meath (Laytown, '94 D.N.F.C.).—Kerry (Muckross, H. MS., coll. Fg.).

Under fir-bark.

TROGOSITIDÆ.**Tenebrioides mauritanicus**, L.

ULSTER. LEINSTER.

Donegal (Coolmore, in bread, '94 J. Ht. Cr.).—Down (near Belfast, '85 H.; timber yard, B.).—Dublin (local, '54 Hn.).

An imported species, found in bakers' shops, warehouses, and similar localities.

Thymalus limbatus, F.

MUNSTER.

Kerry (Kenmare, '98 Ht. 4).

Taken in numbers amongst a mass of leaves and fungi by Mr. J. R. Hardy, July, 1898.

COLYDIIDÆ.

Synchita juglandis, F.

ULSTER.

Down (near Belfast, '85 H.).

Monotoma juglandis of this reference: the specimens cannot be traced.

Cerylon histeroides, F.

ULSTER. MUNSTER.

Derry (Magilligan, B.).—Antrim (Belvoir Park, Sn.).—Kerry (Killarney, '98 Ht. 4).

CUCUJIDÆ.

Rhizophagus cribratus, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Tyrone (Caledon, '96 J. 2).—Armagh ('91 J. 2; Loughgilly, J.).—Mayo (Westport, '91 F. 1).—Galway ('91 F. 1).—Dublin (Little Dargle, '00 Ht. 3).—Cork (Castle Cor, '47 W. 1).

Under bark, not common.

R. depressus, F.

ULSTER. CONNAUGHT. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Armagh (J.; Poyntzpass, '00 J. 3).—Galway (Tuam, '95 Cr. 1)—King's County (Clonad Wood, '95 Ht. 5).

Under bark of fir.

R. perforatus, Er.

ULSTER. CONNAUGHT. LEINSTER.

Armagh ('91 J. 2).—Galway ('91 F. 1, coll. Wr.).—Dublin (local, '00 Ht. 3).

B. parallelocollis*, Kr.*ULSTER.**

Antrim (Armoy, Cs.).—Armagh ('90 J. 2).

Dr. G. W. Chaster found this species, in numbers, crawling on tombstones in Armoy Churchyard, September, 1901, and suggest that it may have been feeding on lichens. It has been recorded as inhabiting graveyards in England, France, and Germany.

B. ferrugineus*, Payk.*ULSTER. CONNAUGHT. LEINSTER. MUNSTER.**

Donegal (Foyle dist., '00 B.).—Galway (Tuam, under fir bark '95 Cr. 1).—Dublin (Mount Merrion, '54 Hn.).—Cork (Castle Cor, '47 W. 1).

B. dispar*, Gyll.*ULSTER. CONNAUGHT. MUNSTER.**

Donegal and Derry (Foyle dist., '00 B.; Coolmore, '94 J. Ht. Cr.).—Down (Newcastle, Ch.).—Armagh ('88 J. 5).—Fermanagh (Tempo, '97 L. 1).—Roscommon (Mote Park, '98 Ht. 1).—Galway (Tuam, '95 Cr. 1).—Clare (Glenomeragh, Ht.).

Local, under bark and in fungi.

Læmophloeus pusillus*, Schön.*ULSTER. LEINSTER.**

Donegal ("Guidore," ? '53 Fg.).—Dublin (in grain, &c., imported '56 Hn. 1).

L. ferrugineus*, Steph.*LEINSTER.**

Louth (south, '00 Ht. 3, coll. C.).—Ireland (H. coll.).

Silvanus surinamensis*, L.*LEINSTER.**

Dublin (in sugar stores, '54 Hn.).

MONOTOMIDÆ.***Monotoma spinicollis*, Aubé.****MUNSTER.**

Cork (Middleton, '95 Wr.).

Taken by sweeping under fir trees.

M. picipes, Herbst.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Down (Belfast, '85 H.).—Armagh ('88 J. 2).—Dublin (Merrion, '54 Hn.).—Wicklow (Wooden Bridge, Fg. MS.).—Waterford ('78 P.).—Kerry (Valentia).

M. longicollis, Gyll.

MUNSTER.

Cork (Kanturk, '47 W. 1).

LATHRIDIIDÆ.

Anommatus xii-striatus, Müll.

LEINSTER.

Dublin (Rochestown, in decayed potatoes, '54 Hn.).

Lathridius lardarius, De Geer.

ULSTER. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Louth, Dublin, Cork, Kerry. Frequent.

Coninomus nodifer, Westw.

ULSTER. LEINSTER. MUNSTER.

Common in the north; also in the counties of Dublin, Wicklow, Wexford, Limerick, Waterford, Cork, Kerry.

Enicmus minutus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

E. transversus, Ol.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster, Galway, Dublin, Wicklow, Carlow, Wexford, Cork.

Cartodere ruficollis, Marsh.

ULSTER.

Down (near Belfast, '85 H.).

Lathridius ruficollis of Haliday's list, but the specimens are not in his collection.

[*C. filiformis*, Gyll. The record, Armagh ('92 J. 4), is to be deleted.]

C. flum, Aubé.

LEINSTER.

Dublin (Glasnevin Herbarium, M. coll.).

Corticaria pubescens, Gyll.

ULSTER. LEINSTER. MUNSTER.

Armagh (J.).—Dublin ('54 Hn.; Ball's Bridge, Fg. MS.; Tolke Valley, '00 Ht. 3, coll. Fr.).—Waterford ('78 P.).—Ireland (H. coll.).

This species has occurred in quantity in corn stores.

C. crenulata, Gyll.

LEINSTER.

Dublin (North Bull, '00 Ht. 3).

A single specimen on the golf-links.

C. denticulata, Gyll.

ULSTER.

Donegal (Foyle dist., '00 B.).—Antrim (banks of Lagan Canal near Lisburn, Ht., coll. B.).—Armagh ('92 J. 4).

Rare, in moss and flood refuse.

C. serrata, Payk.

ULSTER.

Armagh (rare, '92 J. 4).

C. umbilicata, Beck.

ULSTER. MUNSTER.

Antrim (Portballintrae, '94 T.; Blackhead, in dry tufts of grass, Ht., coll., B.).—Kerry (?Rossbegh, "at the roots of the sea-reed," '55 Hn. 2).

Very local.

C. fulva, Com.

MUNSTER.

Tipperary (Nenagh, Sp.).

C. elongata, Humm.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Lough Neagh, Ht. Ballyclare, B.).—Down (near Belfast, '85 H.).—Armagh ('92 J. 4).—

Meath (Laytown, Ht.).—Dublin ('95 Ht. 3).—Wicklow (Ovoca, H. coll.).—Wexford (Slaney Estuary, Ht.).—Clare (Corrofin).—Waterford ('78 P.).

***C. fenestralis*, L.**

LEINSTER.

King's County (Clonmacnoise, '00 Ht. 1; Seagull Bog, near Tullamore, Ht.).

***Melanophthalma gibbosa*, Herbst.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***M. transversalis*, Gyll.**

MUNSTER.

Cork (Kanturk, '47 W. 1).

Corticaria transversalis of list.

***M. fuscula*, Humm.**

ULSTER. LEINSTER. MUNSTER.

Antrim (Portballintræ, '94 T.; Ballycastle, T.).—Louth (Greenore, '96 J. 2).—Wexford (Killoughrum, Slaney estuary, &c., common, Ht.).—Waterford ('78 P.).

Local. The records, Armagh ('92 J. 4), and Dublin ('95 Ht. 3), are to be referred to *M. gibbosa*, Herbst.

CRYPTOPHAGIDÆ.

***Telmatophilus caricis*, Ol.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in marshy places on *Carex*.

***T. typhæ*, Fall.**

MUNSTER.

Clare (Lough Doon, Ht.).

Swept off herbage on the lake shore.

[*T. Schönherr*, Gyll. The record, Armagh ('92 J. 4), is to be deleted.]

Antherophagus nigricornis, F.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Kinbane Head, Cs.).—Down (near Belfast, '85 H.).—Queen's County (Abbey-leix, Bn.).—Kerry (Derrycunihy Wood, Cs.).

Mr. Buckle found this species in nests of *Bombus terrestris*.

A. pallens, Gyll.

ULSTER. CONNAUGHT. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim and Down (Ballycastle, Cs.; Tollymore Park, H. coll.).—Galway (Clonbrock, '96 Ht. 2).—Meath (Laytown, Ht.).—Dublin (local, '54 Hn.; Dundrum, Bk.).

Not common.

Cryptophagus lycoperdi, Herbst.

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Dublin (Killiney strand, '00 Ht. 3).—Waterford ('78 P.).

C. setulosus, Sturm.

ULSTER.

Derry (Foyle dist., in nest of *Bombus*, '00 B.).—Antrim and Down (Ballycastle, Cs.; Belfast dist., Ht., coll. B.).—Armagh ('92 J. 4; Churchill, J.).

C. pilosus, Gyll.

ULSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Waterford ('78 P.).

C. saginatus, Sturm.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Armagh ('88 J. 2).—Louth (C.).—Dublin (local, '00 Ht. 3).—Kerry (Valentia, '98 Ht. 3).

[*C. umbratus*, Er. The record, Armagh ('92 J. 4), is to be deleted.]

C. scanicus, L.

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Down, Armagh, Dublin, Waterford, Kerry.

The variety *patruelis*, Sturm., has been found in the counties of Donegal, Armagh, Louth, and Dublin.

***C. dentatus*, Herbst.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. *C. fumatus* of old lists.

***C. distinguendus*, Sturm.**

ULSTER. CONNAUGHT. LEINSTER.

Derry (Foyle dist., in nest of *Bombus*, '00 B.).—Sligo (Ballysaddare, Ht.).—Meath (Laytown sandhills, '00 Ht. 8).

***C. cellaris*, Scop.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (Belfast dist., 85-H.). Armagh (Poyntzpass, '97 J. 2).—Galway (Wr.).—Dublin (North Bull, '00 Ht. 3).—Cork (Kanturk, '47 W. 1).—Kerry (Glena Wood, Cs.).

Local. The records, Coolmore ('94 J. Ht. Cr.), and Maghery ('88 J. 2), are to be referred to *C. dentatus*, Herbst.

***C. affinis*, Sturm.**

ULSTER.

Derry (Magilligan, Ht., coll. B.).—Antrim (Cave Hill, coll. B.).

The records, Armagh ('92 J. 4), and Stormount ('00 J. 3), are to be deleted.

***C. pubescens*, Sturm.**

ULSTER. CONNAUGHT.

Armagh ('88 J. 2).—Galway (Clonbrock, coll. D.).

The Clonbrock specimens were found in a wasp's nest, by the Hon. R. E. Dillon.

***C. bicolor*, Sturm.**

LEINSTER. MUNSTER.

Dublin (Dundrum, '00 Ht. 3, coll. Bk.).—Waterford ('78 P.).

***Micrambe vini*, Panz.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Paramesocoma melanocephalum*, Herbst.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '80 B.).—Cavan (banks of the R. Annalee, '94 J. Ht. Cr.).—Armagh (Mullinure, J.).—Dublin (River Tolka, '94 Ht. 8; Dodder Banks near Tallaght, Ht.).—Kerry (Kenmare, '98 Ht. 4).

Local in flood refuse. The specimens from all of these localities are referable to the variety with shining black elytra, and infusate tibiae.

***Atomaria diluta*, Er.**

ULSTER.

Armagh (in moss, rare, '92 J. 4).

***A. fumata*, Er.**

ULSTER.

Antrim (Ballycastle, Ht., coll. Cs.). Armagh (J.; Lowry's Lough, '92 J. 4).—Ireland ('56 W., coll. H.).

[*A. Barani*, Bris. The record, Armagh ('92 J. 4), is to be referred to the preceding species.]

***A. nigriventris*, Steph.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Dublin (local, '54 Hn.).—Cork (Kanturk, '47 W. 1).—Ireland (56 W., coll. H.).

***A. Wollastoni*, Sharp.**

ULSTER.

Donegal (Foyle dist., '00 B.).

A rare northern species—originally described from Scotland. Mr. Buckle obtained his specimen amongst the sweepings of a barn after threshing and cleaning oats. It has also been recorded from Finland, Norway, and the Netherlands.

***A. linearis*, Steph.**

LEINSTER.

Dublin (C. coll.).—Ireland ('56 W.; H. coll.).

***A. elongatula*, Er.**

ULSTER. CONNAUGHT. MUNSTER.

Armagh (J.).—Galway (Wr.).—Cork (Kanturk, '47 W. 1).

[*A. badia*, Er. The Armagh, record ('90 J. 1), is to be erased.]

***A. fuscipes*, Gyll.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Down, Armagh, Meath, Dublin, King's County, Wexford, Waterford.

Locally common.

***A. peltata*, Kr.**

ULSTER.

Donegal (Foyle dist., under an oat-rick, '00 B.).

***A. nigripennis*, Payk.**

ULSTER.

Armagh ('92 J. 4).

***A. munda*, Er.**

ULSTER. MUNSTER.

Donegal (Foyle dist., in nest of *Bombus terrestris*, Ch., coll. B.).—Waterford ('78 P.).

***A. fuscata*, Schön.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Fermanagh, Galway, Kilkenny, Wexford, Waterford, Kerry.

Frequent.

***A. atra*, Herbst.**

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Dublin ('54 Hn.).—Ireland ('56 W., coll. H.).

One or two of these records were probably intended for some other species—possibly *A. analis*, Er. Wollaston referred the *A. atra* of his Kanturk list (47 W. 1) to *A. analis*, Er., in a subsequent paper ('56 W.). The record, Armagh ('90 J. 1), is to be referred to a dark variety of *A. mesomela*, Herbst.

A. pusilla, Payk.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Galway, Louth, Meath, Dublin, Wicklow, Kilkenny, Wexford, Limerick, Cork.

Common.

A. atricapilla, Steph.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

A. berolinensis, Kr.

ULSTER. MUNSTER.

Donegal (Foyle dist., Ht., coll. B.).—Antrim (Murlough, Ht., coll. Cs.; Blackhead, Ht., coll. R.).—Armagh ('94 J. 1)—Kerry (Dingle, Sh., coll. Ht.).

Has been confused with *A. atricapilla*—probably common.*A. basalis*, Er.

ULSTER. LEINSTER.

Armagh ('92 J. 4; Poyntzpass, 97 J. 1).—Louth (Braganstown, '95 Ht. 7).—Wexford (Ht.).

A. mesomelas, Herbst.

ULSTER. LEINSTER.

Antrim and Down (Belfast, Ht., coll. B.).—Armagh ('92 J. 4).—Dublin ('54 Hn.).—Carlow (Borris, '95 Ht. 8).—Wexford (Slaney estuary, Rosslare, Forth Hills, Ht.).—Ireland ('56 W., coll. H.).

Frequent, and very variable.

[*A. gutta*, Steph. The record, Armagh ('92 J. 4), is to be referred to the preceding species.]*A. apicalis*, Er.

LEINSTER. MUNSTER.

Dublin (Dundrum, '00 Ht. 3).—Waterford ('78 P.).

A. analis, Er.

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Dublin, Wexford, Waterford, Cork, Kerry.

A. ruficornis, Marsh.

LEINSTER. MUNSTER.

Dublin (Dundrum, '00 Ht. 3.).—Waterford ('78 P.).

Ephistemus globosus, Waltl.

ULSTER. LEINSTER. MUNSTER.

Antrim (Cranmore near Belfast, J.).—Armagh ('90 J. 1).—Carlow Borris '95 Ht. 8).—Waterford (78 P.; Tramore, Ht.).—Kerry (Loo Bridge, Cs.).

E. gyrinoides, Marsh.

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Down, Armagh, Louth, Dublin, King's County, Carlow, Wexford, Limerick, Waterford, Cork, Kerry.

Common in moss. The variety *dimidiatus*, Sturm., has occurred at Strangford (H. coll.).

MYCETOPHAGIDÆ.

Typhæa fumata, L.

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Armagh ('90 J. 1; Poyntzpass, '97 J. 3).—Dublin (Roebuck, '54 Hn.; Leopardstown, C.; Raheny and North Bull, Ht.).—Wicklow (Ovoca, H. coll.).—Wexford (Rosslare, Ht.).—Limerick and Clare (Ht.).—Waterford ('78 P.).—Kerry (Loo Bridge, Cs.).

In moss, under bark; local.

BYTURIDÆ.

Byturus tomentosus, F.

ULSTER. LEINSTER. MUNSTER.

Common, but we have no records from the west.

DERMESTIDÆ.

Dermestes vulpinus, F.

ULSTER.

Antrim (High-street, Belfast, coll. Orr).

D. murinus, L.

ULSTER.

Antrim (Belfast, Orr).—Ireland (H. coll.).

D. lardarius, L.

ULSTER. LEINSTER.

Antrim (Belfast, Orr).—Fermanagh (Tempo, '97 L. 1).—Dublin ('54 Hn.; Museum stores, Ht.).

No doubt this destructive insect occurs in most towns, but there are few records.

Attagenus pello, L.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Armagh ('92 J. 4).—Dublin ('54 Hn.; '01 Cr.).—Tipperary (Clonmel).

Lumber rooms, and stores.

[*Megatoma undata*, Er. The record, Dublin (Glencullen, '92 C. 4), is to be deleted.][*Anthrenus varius*, F. This species is marked as Irish in Mr. Furlong's MS. list.]**BYRRHIDAE.****Byrrhus pilula, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Coolmore, J.).—Down (Newcastle, '57 H.; near Belfast, '85 H.).—Armagh (J.).—Mayo (Achill, '98 Ht. 2).—Galway (Ht.).—Louth (Carlingford, J.).—Dublin ('54 Hn.; Glenasmole, Howth, Tallaght).—Wicklow (Bray Head, '94 Ht. 1; Lugnaquilla, '96 Ht. 1).—Clare (Ballyvaughan, '95 Ht. 6).—Limerick (Adare Castle, Ht.).—Cork (Bn.; Berehaven, '94 J. Ht. Cr.).—Kerry (Carrantuohill, '99 Sch. and Cr.).

Rather local; more frequent in highland districts. The record, "var. *Dennyi*, Steph. ('88 J. 1)," is to be referred to the type.

B. fasciatus, F.

ULSTER. CONNAUGHT. LEINSTER.

Derry (Foyle dist., '00 B.).—Down (Newcastle, '00 J. 4).—Mayo (Croagh Patrick, Wr.).—Wicklow (Lugnaquilla, '96 Ht. 1).

On hills; in numbers where found. The records, Coolmore ('95 J. 1), Armagh ('91 J. 2), and Carlingford ('88 J. 1; '91 J. 2), are to be referred to *B. pilula*, L.

***B. dorsalis*, F.**

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Buncrana, '95 Wr.).—Antrim (Cave Hill, B.).—Down (Newcastle, '57 H., coll. Wr.).—Louth (Carlingford Mountain, J.; Termonfeekin strand, C.).—Meath (Laytown, '94 D.N.F.C.).—Wexford (Courtown, '93 C. 4).

Local, and not common.

***Cytilus varius*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Morychus æneus*, F.**

CONNAUGHT.

Galway ('91 F. 1, coll. Wr.).

***Simplocaria semistriata*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Aspidiphorus orbiculatus*, Gyll.**

LEINSTER. MUNSTER.

Wexford (Forth Hills, Ht.).—Waterford (Glenshelane Valley, Ht.). Taken by sweeping under fir trees.

GEORYSSIDÆ.

***Georyssus pygmaeus*, F.**

MUNSTER.

Clare (Killaloe, '71 S.).—Kerry (Muckross, Hr.).

PARNIDÆ.

***Elmis æneus*, Müll.**

ULSTER. MUNSTER.

Antrim (Rathlin Island, '97 Hr.).—Kerry (Killarney, Fg. MS.).

E. Volkmar, Panz.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Galway, Westmeath, Dublin, Wicklow, Waterford, Cork, Kerry.

Local; on river banks.

E. parallelopipedus, Müll.

ULSTER. LEINSTER. MUNSTER.

Donegal (Coolmore, '94 J. Ht. Cr.).—Derry (Foyle dist., '00 B.).—Antrim (Lough Neagh, H. coll.).—Dublin (Dodder, '54 Hn.).—Waterford ('78 P.).—Cork (Bandon, '47 W. 1).—Kerry (River Fleak, Killarney, '47 W. 1; Muckross, Hr.).

Limnius tuberculatus, Müll.

ULSTER. LEINSTER. MUNSTER.

Common in Ulster, also in the counties of Dublin, Wicklow, Clare, Limerick, Waterford, Cork, Kerry.

Common.

Parnus prolifericornis, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

P. auriculatus, Panz.

ULSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Whitepark, Cs.; shore of Lough Neagh, '01 Be.).—Down (near Belfast, '85 H.).—Kerry (Fg. MS.).

Locally common under stones near water, in early spring.

HETEROCERIDÆ.**Heterocerus flexuosus, Steph.**

ULSTER. CONNAUGHT. LEINSTER.

Down ("Belfast Lough shore, '47. 7. 5." H. coll.; Strangford Lough, Ht., coll. B.).—Sligo (Enniscrone, J.).—Dublin (North Bull salt-marsh, under stones in July, '00 Ht. 3).

Mr. C. W. Buckle obtained a large and very variable series on the shores of Strangford Lough.

H. arenarius, Kies.

ULSTER. LEINSTER.

Down (Strangford Lough, Ht., coll. B.).—Dublin (Baldoyle and Portmarnock, H. coll.).

The identity of the *Heterocerus* recorded in the Dublin list ('53 Hn.) as *H. femoralis*, Kies., and later ('55 H. 1) as *H. arenarius*, Kies., has not been definitely ascertained. Some of the Dublin specimens, from the Haliday collection, have been examined by Mr. G. C. Champion, who suggests that they may be identical with *H. rectus*, Wat. As there would seem to be some doubt as to the identity of the *H. femoralis* of British collections,* it seems best to record the Irish species as above, especially as the name was first applied to the Irish specimens.

H. marginatus, F.

ULSTER. CONNAUGHT.

Donegal (Buncrana, '95 Wr.).—Antrim (Belfast, J., coll. Pn.).—Sligo (Enniscrone, J.).

Rare. Mr. J. J. Walker records it as occurring plentifully at Buncrana in company with *Bledius spectabilis*, "varying to a handsome unicolorous dark fuscous form, with the usual yellow markings on elytra quite obsolete."

H. britannicus, Kuw.

ULSTER. MUNSTER.

Down (river bank between Comber and Strangford Lough, Ht., coll. B.).—Cork (shore of the creek of the Owenberg River, Cork Harbour, '55 H. 1).

Mr. Haliday's specimens, recorded as *H. Marshami*, were found in company with *Aëpus*, *Micralymma*, and other local insects. Mr. C. W. Buckle took forty specimens in an area of less than two square feet, their borings occurred at about high-water mark, and were from an inch to an inch and a-half deep in the sand. There is an example in the Haliday collection labelled "Clifden shore" which, Mr. Buckle informs us, may be a part of the shore near Bangor, locally known by that name. We are indebted to Mr. G. C. Champion for the verification of the Haliday specimens.

* Mr. G. C. Champion informs us that specimens of a *Heterocerus*, which had been representing *H. femoralis* in his collection, were reported not to be that species by Herr Kuwert.

LUCANIDÆ.

Dorcus parallelipedus, L.

ULSTER.

Armagh ('92 J. 4).

A single specimen, which was brought to Mr. Johnson by one of his pupils.

Sinodendron cylindricum, L.

ULSTER. CONNAUGHT. LEINSTER.

Fermanagh (Tempo, '97 L. 1).—Cavan (Lough Oughter, '94 J. Ht. Cr.).—Roscommon (Mote Park, '98 Ht. 1).—Westmeath (Hare Island in Lough Ree, '00 Ht. 1).—Dublin (Dollymount, '00 Sr.).—Wicklow (Bray, Ch.; Powerscourt, '00 Sr.).—Queen's County (Abbey-leix, '01 Bn.).

Local; sometimes occurring in numbers in old trees, especially oaks.

SCARABÆIDÆ.

Onthophagus ovatus, L.

There is a specimen of this species in the Haliday collection marked as Irish, but in his MS. list Haliday notes "probably not Irish specimens" after this species.

O. fracticornis, Payk.

CONNAUGHT. MUNSTER.

Galway (Roundstone, Ht.).—Clare (Lahinch, Ht., coll. Gr.).—Waterford (Ardmore, '97 C.).—Cork (Queenstown, in sheep dung, '95 Wr.; Glengariff, Yr.; Rosscarbery, '95 C. 1).—Kerry (Dingle, Ht.; Rossbehy, '55 Hn. 2; Killarney, Fg.; Waterville and Caragh Lake, coll. Yr.).

Local; usually on sandhills. This and the following species would seem to be confined to the south and west of Ireland.

O. nuchicornis, L.

CONNAUGHT. MUNSTER.

Galway ("Galway M'C." H. MS.).—Waterford (Tramore, Fg. MS.).—Kerry (Ventry and Dingle, '55 Hn. 2; Rossbehy, '55 Hn. 2 '71 S.; Glenbegh, Fg. MS.).

There are Irish specimens of this species in the Haliday and Furlong collections, probably from one of these localities. But it is evidently much rarer than the preceding species.

***Aphodius erraticus*, L.**

CONNAUGHT. LEINSTER. MUNSTER.

Galway (Roundstone, T.).—Dublin (Phoenix Park, '54 Hn.; Templeogue, in flood refuse, '00 Ht. 3).—Kildare (Maynooth, '94 C. & Cr.).—Wicklow (Arklow Fg. MS.).—Wexford (Enniscorthy, Ht.).—Waterford ('78 P.; Tramore J.).—Cork (Queenstown, '95 Wr.).

Not common.

***A. subterraneus*, L.**

ULSTER.

Down (near Belfast, '85 H.).

The Belfast specimens cannot be traced. It is curious that this is one of the species after which Haliday has omitted the mark ⊕ (meaning "certainly Irish") in his MS. list of Irish insects, but this may be due to an oversight.

***A. fossor*, L.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Louth, Dublin, Kilkenny, Clare, Waterford, Cork, Kerry.

A common species, occurring probably in all counties.

***A. fœstens*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Derry (Magilligan, B.).—Antrim (Ballycastle, Ht., coll. Ws.).—Down (near Belfast, H.).—Armagh (Loughgall, '96 J. 1).—Sligo (Rosses Point, J.).—Galway (Roundstone, T.).—Dublin ('54 Hn.; Templeogue, coll. Fn.; North Bull, '00 Ht. 3).—Wicklow (Brittas sands, '96 D.N.F.C.).—Kilkenny (Thomastown, Ht.).—Kerry (Caragh Lake, '01 Ch.).

Rare; usually met with in the autumn.

***A. fimetarius*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

A. scybalaris, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Bundoran T.).—Antrim (Portrush, J.).—Down (Newcastle, '97 J. 1).—Sligo (Enniscrone, J.).—Mayo (Ballina, '71 S.).—Dublin ('54 Hn.).—Clare (Lahinch, Gr.).—Cork (Rosscarbery, '95, C. 1).—Kerry (Dingle, Ht.).
Frequent, and probably occurs in most localities.

A. ater, De G.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

A. constans, Duft.

ULSTER. CONNAUGHT.

Donegal and Derry (Foyle dist., '00 B.).—Galway (Roundstone, Ht.).

Found commonly in both localities.

A. granarius, L.

ULSTER.

Donegal and Derry (Foyle dist., '00 B.).—Down (near Belfast, '85 H.).

A. nitidulus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (Dundrum sands, Fg. MS.).—Donegal and Derry (Foyle dist., '00 B.).—Antrim (Ballycastle, Ca.).—Down (Dundrum sands, Fg. MS.).—Sligo (Rosses Point, J.).—Louth (Greenore, '95 J. 1).—Dublin (Templeogue, '00 Ht. 3).—Kerry (Waterville, Fg. MS.).

Not common.

A. sordidus, F.

ULSTER. LEINSTER. MUNSTER.

Derry (Magilligan, coll. B.).—Antrim (Ballycastle, Ca. & T.).—Dublin (Roebuck, '54 Hn.).—Kerry (Ventry and Rossbehy, '55 Hn. 2).

Very local.

A. rufescens, F.

ULSTER. CONNAUGHT. LEINSTER.

Common in Ulster; also in the counties of Sligo, Galway (Inishmore, &c.). Louth, Dublin, Wicklow, Wexford, probably overlooked in the south-west.

A. lapponum, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Ardara, '92 J. 3).—Antrim ('55 H. 1; Cave Hill, H. coll.).—Down (Slieve Donard, '91 F. 1, coll. Ch.).—Galway (Leenane mountain, Ht.; Ben Lettery, '95 Ht. 6).—Wicklow ('55 H. 1; Lugnaquilla, H. coll.; Carrick Mt., Sp.).—Kerry (Mucksna, near Kenmare, '98 Ht. 4).

Local; occurs in mountain districts.

A. foetidus, F.

ULSTER. LEINSTER.

Donegal (Coolmore, '95 J. 1; Ardara, '92 J. 3).—Louth (Bel-lurgan, '95 J. 1).

A. putridus, Sturm.

ULSTER. CONNAUGHT.

Donegal (Foyle dist., '00 B.).—Antrim (Cushendun, J.).—Down (Slieve Donard, '91 F. 1).—Sligo (Enniscrone, J.).

A. plagiatus, L.

LEINSTER.

Dublin (North Bull salt-marsh, '00 Ht. 3).

Found in numbers, black variety only, under the mud of dried-up pools.

A. porcus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Ballycastle shore, T.).—Down (near Belfast, *A. turpis*, '85 H.).—Galway (Woodford, remains in borings of *Rhagium bifasciatum*, Ht.).—Meath (Laytown sandhills, '00 Ht. 3).—Dublin (Woodlands, '94 Ht. 3; Dundrum and Portmarnock, '00 Ht. 3).—Waterford ('78 P.).

Rare; occurs in the autumn.

A. pusillus, Herbst.

ULSTER.

Antrim (Lagan Canal, near Lisburn, Ht., coll. B.).—Down (near Belfast, *A. granum*, '85 H.; Dundrum sands, Fg. MS.).

A. merdarius, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Frequent in Ulster; and has been taken in the counties of Sligo, Louth, Dublin, Kildare, Queen's County, Waterford, Cork, Kerry.

[*A. tessulatus*, Payk. The record, Portrush ('91 F. 1), is to be deleted].

A. conspurcatus, L.

There is an Irish example of this species in the Dublin Museum, from the Trinity College collection.

A. sticticus, Panz.

MUNSTER.

Cork (Middleton, '95 Wr.).—Ireland (H. coll.).

A single specimen taken by sweeping under fir trees, by Mr. J. J. Walker.

A. punctato-sulcatus, Sturm.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

A. prodromus, Brahm.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

A. contaminatus, Herbst.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*A. obliteratus*, Panz. The record, Armagh ('92 J. 4), should have referred to the preceding species.]

A. luridus, F.

ULSTER. CONNAUGHT. MUNSTER.

Donegal (Portsalon, Sn.).—Down (near Belfast, '85 H.).—Galway (H. coll.).—Waterford (Tramore sands, Fg. MS.).

Rare.

A. rufipes, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***A. depressus*, Kug.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Fairly common; the variety with red elytra has been recorded from Ardara ('92 J. 3), and there are examples of it in the Holiday collection.

***Ægialia arenaria*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common on sandhills.

***Geotrupes typhoeus*, L.**

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.; Newcastle, '90 J. 1).—Dublin (Howth, '92 B.; Fr.; Killiney, '54 Hn.).—Wicklow (frequent, '54 Hn.; Seven Churches, Fg. MS.).—Waterford (Ardmore, '97 C.).

Local; recorded only from the eastern side of the island.

***G. spiniger*, Marsh.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim, Sligo, Armagh, Louth, Dublin, Clare.

Probably occurs throughout the country, but has been confused with the following species.

***G. stercorarius*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***G. sylvaticus*, Panz.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***G. vernalis*, L.**

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Portrush, '97 J. 1; Ballintoy, J.).—Down (near Belfast, '85 H.).—Fermanagh (Tempo, '97 L. 1).—Dublin ('55 Hn. 1; Howth, &c., '56 Hn. 1).—Wicklow (Seven Churches, Fg. MS.).—Queen's County (H. MS.).—Cork (Rosscarbery, '95 C. 1).—Kerry (Carrantuohill, '99 Sch. & Cr.).

Local and not common.

[*G. pyrenæus*, Charp. The record, Cushendun ('90 J. 2), requires confirmation, as the specimen from which it was made cannot be traced.]

***Trox scaber*, L.**

LEINSTER. MUNSTER.

Dublin (Dundrum, '00 Ht. 3).—Cork (Fg. MS.).

***Serica brunnea*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Melolontha vulgaris*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, in wooded districts. The following interesting account of a plague of beetles which visited the west of Ireland, in the summer of 1688, occurs in *Boate's "Natural History of Ireland." The description—contributed by Dr. T. Molineux—is accompanied by an excellent figure of the Common Cockchafer (*Melolontha vulgaris*):—"The first time great numbers of these insects were taken notice of . . . was in the year 1688. They appear'd on the south-west coast of the county of *Galloway*, brought thither by a south-west wind. . . . From thence they made their way into the more inland parts . . . multitudes of them shew'd themselves among the trees and hedges in the day time, hanging by the boughs, thousands together in clusters, sticking to the back one of another, as is the manner of bees when they swarm . . . they continued quiet with little or no motion during the heat of the sun, but towards evening or sunset, they would all rise, disperse, and fly about, with a strange humming noise, much like the beating of drums at some distance, and in such vast incredible numbers, that they darkened the air for the space of two or three miles square. . . . A short while after their coming, they had so entirely cat up and destroy'd all the leaves of the trees for some miles round about, that the whole country, tho' it was the middle of summer, was left as bare and naked as if it had been in the depth of winter, making a most unseemly and indeed frightful appearance . . . the grinding of the leaves in the mouths of this vast multitude all together, made a sound very much resembling the sawing of timber. . . . Nor did the mischievous effects of this pernicious vermin stop

* "A Natural History of Ireland." By Dr. Gerard Boate, Thomas Molineux. M.D., F.R.S., and others. Dublin. 1755.

here, their numerous creeping spawn, which they had lodg'd under ground . . . fell a devouring the roots of the corn and grass . . . to the vast damage of the country. . . . High winds, wet and misting weather, were extremely disagreeable to the nature of this insect. . . . During these unfavourable seasons of weather, the swine and poultry of the country at length grew so cunning, as to watch under the trees for their falling; and when they came to the ground eat them up in abundance, being much pleased with the food. . . . A year or two ago in the summer, all along the south-west coast of the county of *Galloway*, for some miles together, there were found dead on the shore, such infinite multitudes of this vermin, and in such vast heaps, that by a moderate estimate, one computed there could not be less than forty or fifty horse loads in all. . . . This last year, 1697, they reached as far as the *Shannon*, and some of the scattered loose parties crost the river, and got into the province of *Leinster*, but these met with a stronger army of jackdaws, that did much execution among them, killing and devouring great numbers."

***M. hippocastani*, F.**

LEINSTER. MUNSTER.

Meath ('00 Ht. 3).—Dublin (Roebuck, '54 Hn.).—Wicklow (Grey-stones, '78 M.; Poulaphouca, '92 B.).—Wexford (Courtown, '92 C. 6).—Cork ('91 Bn.; Youghal, H. MS.; Bandon, '47 W. 1).—Kerry (Muckcross, '59 Bc.; Kenmare, Cs.).

Locally common, but rarer than the preceding species. According to Fowler it has not occurred in England further south than the Lake district, and in Scotland appears partly to take the place of *M. vulgaris*, F. Distribution—northern and central Europe chiefly, and Siberia.

***Phyllopertha horticola*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Abundant in the south and west. The variety *suturalis*, Steph., has been found near Dingle (Ht.), and at Lahinch on the Clare coast. It is smaller, and of more depressed form, with the suture, margins of the elytra and humeral prominences black.

***Cetonia aurata*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Milford, coll. Osb.; Slieve League, '95 T.).—Antrim (Belfast, J.; a specimen in Museum of Belf. Nat. Hist. and Phil. Soc.,

is labelled Whitehouse, '91 J. 4).—Galway (Inishmore, '95 Ht. 6: Dun Angus, Sp.; Roundstone, Ht.).—Dublin (Howth and Lambay Island, '91 Jones).—Limerick (Curragh Chase, Fg. MS.).—Waterford ('91 J. 5; Tramore, '95 Ht. 6).—Cork (91 J. 5; Glengariff, Fg. coll.; Queenstown, '91 Bn. 1; Glandore, Sch.; Rosscarbery, '95 C. 1).—Kerry (Sneem, '91 J. 5; Kenmare, '98 Ht. 4).

Locally common in the south and west, but of rare occurrence in the east. On Inishmore in Galway Bay a greater number of specimens were taken than in any other locality in Ireland. The species is common in the south of Britain, becoming rare towards the north; and in Scotland it would seem to be largely replaced by the allied species *C. floricola*, Herbst. We have no record of the occurrence of the latter in Ireland.

THROSCIDÆ.

Throsus dermestoides, L.

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Armagh (Loughgall, J.).—Dublin (Glencullen, '92 C. 4; Lucan, '00 Ht. 3).—Wicklow (Newrath Bridge, H. MS.).—Kilkenny (Thomastown and Woodstock, Ht.).—Wexford (Slaney estuary, Ht.).—Clare (Broadford, Ht.).

ELATERIDÆ.

Lacon murinus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Galway (Furnace and Aran Isles, &c.), Louth, Meath, Dublin, Wexford, Clare, Kerry.

Occurs locally on sandhills round the coast.

Cryptohypnus riparius, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. dermestoides, Herbst.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Ardara, '92 J. 3).—Fermanagh (Belleisle, '98 Pr.).—Galway (Leenane, Ht.).—Dublin (bank of the R.

Dodder, '54 Hn.).—Clare and Limerick (lake shores, Ht.).—Kerry (Kenmare, Cs.).

C. iv-guttatus, Lap.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Bruckless, '95 J. 1).—Down (near Belfast, '85 H.).—Fermanagh (Belleisle, '98 Pr.).—Galway (Leenane, Ht.).—Westmeath (Athlone dist., '00 Ht. 1).—Dublin (Dodder banks near Tallaght, Ht.).—Clare and Limerick (lake shores, Ht.).—Waterford (banks of the Blackwater, Lismore, and Cappoquin, Ht.).—Kerry (Kenmore, '98 Ht. 4).—Lough Neagh and Shannon (H. MS.).

Local on river banks and lake shores. Often found in company with the preceding species, of which some writers consider it to be a mere variety. The *Elatér iv-pustulatus* of Haliday's Belfast list is to be referred to the present species (*vide* H. MS.).

Elatér pomorum, Herbst.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Kilderry, '00 B.).—Armagh (Churchill, '88 J. 2).—Galway (Clonbrock, '96 Ht. 2).—King's County (Seagull Bog, near Tullamore, '95 Ht. 5).—Queen's County (Abbeyleix, '01 Bn.).—Carlow (Borris, coll. Freke).—Clare (bog near Finlough, '96 Ht. 2, coll. N.)

Very local; most of the captures were made off birch, usually on boggy heaths.

[The following note occurs in Mr. Haliday's MS. list:—" *Elatér sanguineus*, Powerscourt. Among peat earth, in rotten branch of oak tree, A. F. [Alfred Furlong], litt. ! '49. 2. 17." The *E. sanguineus* here referred to is probably meant for the *E. lythropterus* of present catalogues. Mr. Furlong does not refer to this capture in his MS. list, though the last-mentioned insect is marked therein as occurring in Ireland. The record, however, requires confirmation before so local an insect can be included in our fauna. It seems possible that the Powerscourt *Elatér* may have been the preceding (*Elatér pomorum*, Herbst.).]

E. balteatus, L.

ULSTER. MUNSTER.

Antrim (Rathlin Island, '97 Hr.).—Kerry (Hr. *in lit.*).

Taken by Mr. J. R. Hardy at the roots of broom.

Melanotus rufipes, Herbst.

ULSTER. LEINSTER.

Derry (coll. Bk.).—Down (Rams Island, Lough Neagh, coll. Orr).—Fermanagh (Tempo L.).—Dublin ('54 Hn.).—Wicklow (Powerscourt Deerpark, Fg. MS.).—Carlow (Borris, '95 Ht. 8).—Lough Neagh (H. MS.).

Athous niger, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Frequent in Ulster, and in the counties of Galway, Dublin, Waterford, Clare, Limerick, and Kerry. Usually obtained by beating bird and fir trees.

A. hæmorrhoidalis, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. This species has been the cause of great damage to oat-crops in Galway (see '00 Cr.).

Limonium cylindricus, Payk.

LEINSTER.

Dublin (Taken by Mr. Tardy, '54 Hn.).

The specimens cannot be traced. The *Elateor nigroæneus* of Haliday's Belfast list ('85 H.) may have been meant for a *Limonium*.

Sericosomus brunneus, L.

ULSTER. CONNAUGHT.

Donegal (Coolmore, J.).—Roscommon (Mount Talbot, '98 Ht. 1).

Adrastus limbatus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*Agriotes sputator*, L. The record, Tramore ('97 Ws.), is to be deleted.]

A. obscurus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. For injury caused to crops see ('96 Cr.).

A. lineatus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Dolopius marginatus*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Corymbites cupreus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. We have records of the variety *æruginosus*, F., from the counties of Donegal, Antrim, Fermanagh, Galway, Louth, Dublin, Clare, and Kerry.

***C. tessellatus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Fermanagh, Roscommon, Galway, Dublin, Clare, Kerry.

Locally common on heaths.

***C. quercus*, Gyll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. The var. *ochropterus*, Steph., is equally common with the type in most localities.

***C. seneus*, L.**

MUNSTER.

Cork (near the Tunnel on the Glengariff road, '98 Ht. 4).

Taken by Mr. J. R. Hardy.

[*C. impressus*, F. The record, Armagh ('91 F. 1), is to be deleted.]

***C. bipustulatus*, L.**

MUNSTER.

Waterford (coll. Tp.).

Taken by Mr. H. Tempest near Waterford. The specimen is now in the Museum collection.

***Campylus linearis*, L.**

ULSTER. CONNAUGHT. MUNSTER.

Antrim (Toome, Lough Neagh, coll. Pt.).—Roscommon (banks of the Suck near Mount Talbot, '98 Ht. 1).—Clare (Cratloe Wood, in fir stumps, '98 Ht. 1).—Kerry (Kenmare, Fg. MS.).

Very local.

DASCILLIDÆ.***Dascillus cervinus*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, especially on high ground.

***Helodes minuta*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Down, Armagh, Fermanagh, Sligo, Roscommon, Galway, Louth, Meath, Dublin, Wicklow, Kilkenny, Wexford, Kerry.
Common.

***H. marginata*, F.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Coolmore, '95 J. 1).—Down (near Belfast, '85 H.).—Armagh ('92 J. 4).—Fermanagh (Coolarkin Cave, '96 Jn.; Tempo, L.).—Dublin ('54 Hn.; Tibbradden, Ht.; Lambay, '96 C.).—Cork (Adrigole, '94 J. Ht. Cr.; Queenstown, '95 Wr.).

In marshy places—much rarer than the preceding.

***Microcara livida*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Armagh, Roscommon, Galway, Dublin, King's County, Queen's County, Wexford, Clare, Limerick.

The variety *Bohemani*, Mann., has been taken in the counties of Armagh, Sligo, Galway, Wexford, Clare.

***Cyphon coarctatus*, Payk.**

ULSTER. LEINSTER.

Donegal, Derry, Antrim, Down, Armagh, Dublin.

***C. nitidulus*, Thoms.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Armagh, Galway, Louth, Dublin, Kildare, Cork, Kerry.

***C. variabilis*, Thunb.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. punctipennis, Sharp.

ULSTER.

Antrim (Gortconny Bog near Ballintoy, Ch., coll. Cs.).

Taken by Dr. G. W. Chaster in September, 1901.

C. padi, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster. Roscommon, Galway, Louth, King's County, Cork, Kerry.

Hydrocyphon deflexicollis, Müll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Down (Newcastle, '57 H.).—Galway (Woodford, Ht.).—Dublin (Templeogue, '00 Ht. 3).—Wicklow (River Vartry, '57 H.).—Limerick (Castleconnell, Fg. MS.; Doonass, Nl.).—Waterford (Lismore, '95 Ht. 1).—Kerry (Killarney, '47 W. 1; Kenmare, '98 Ht. 4).—Lough Neagh (H. MS.).

Local on river banks. In recording this species from the Vartry Mr. Haliday remarks—"The Cyphones were busy creeping among the wet gravel, or at the bottom of little pools, to lay their eggs there; while, on lifting up the stones, to procure the larvæ and pupæ from the under-side, the newly disclosed beetles also came up abundantly to the surface, each enveloped in its own silvery air-bubble. Their coat of down is quite impervious to moisture and floating securely on the surface, they spread out their long wings, and rise with ease from the water."

Scirtes hemisphæricus, L.

ULSTER. LEINSTER. MUNSTER.

Armagh (on *Persicaria*, '92 J. 4).—Dublin ('54 Hn.; Raheny Quarries, on *Equisetum*, '00 Ht. 3).—Limerick (Lough Gur, on willows, Ht.).—Waterford (Cappoquin, Ht.).

Locally common, near water.

S. orbicularis, Panz.

ULSTER.

Armagh (on *Persicaria*, '92 J. 1).

MALACODERMIDÆ.***Pyropterus affinis*, Payk.****MUNSTER.**

Kerry (Killarney, '67 R. 1; '98 Ht. 4; Kenmare Demesne, Cs.).

First taken at Killarney by Mr. J. R. Hardy in the summer of 1866, this being the first capture of the species in Britain. Rediscovered in the same locality in July, 1898, by Mr. Hardy and Dr. G. W. Chaster, when several specimens were taken by beating birch trees and by sweeping. On the same occasion Dr. Chaster swept a specimen off birch near Ross Castle in Lord Kenmare's demesne. Elsewhere in Britain, it has been taken in Sherwood Forest, near Doncaster, and in Scotland. On the Continent it occurs in the alpine districts of Sweden, Germany, France, and Russia.

[*Lampyrus noctiluca*, L. Dublin (Castleknock, '54 Hn.; Dundrum, '78 M.). These are the only records of the occurrence of the Glow-worm in Ireland, unfortunately the specimens from which they were made are not forthcoming. At a meeting of the Dublin U. Zool. Assoc., in January, 1854, Mr. Ball states "the glow-worm (*Lampyrus noctiluca*) had been brought from England to Dublin, and, some having escaped, might possibly still be in existence" (Nat. Hist. Rev. I., 1854, p. 91). The Glow-worm is generally distributed throughout England, and occurs as far north at least as the Tay district in Scotland. As a Palearctic species it is very widespread, ranging north to Finland, and eastwards to Siberia.]

Silis ruficollis*, F.*LEINSTER.**

Wexford (south bank of the Slaney estuary near Killurin, Ht.).

Taken abundantly by sweeping herbage close to high-water mark. Elsewhere in Britain this species is only known to occur in the fen districts of eastern England, where it would seem to be very local. Distribution—northern and central Europe (Reitter).

Podabrus alpinus*, Payk.*ULSTER. LEINSTER.**

Down (Tollymore Park, J.; Rostrevor, Fg. coll.).—Dublin (local, '54 Hn.).—King's County (Abbeyleix, '01 Bn.).—Wicklow (Glenmalur Valley, '96 Ht. 1).

Local—common on fir trees in Wicklow.

Telephorus pellucidus, F.

ULSTER. LEINSTER. MUNSTER.

Fermanagh, Meath, Dublin, Kildare, Wicklow, Carlow, Kilkenny, Wexford, Waterford, Cork.

Local—in woods.

T. nigricans, Müll.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Broughshane J. ; Glenarm and Larne, '91 F. 1 ; Belfast dist. ; Ballycastle, '00 J. 4).—Down (near Belfast, B. ; Holywood, Pt.).—Armagh (Loughgall, '92 J. 2 ; Poyntzpass, '98 J.).—Fermanagh (Tempo, '97 L. 1).—Meath (Laytown, '94 D.N.F.C.).—Dublin ('54 Hn. ; Tibbradden, '94 Ht. 3).—Queen's County (Abbeyleix, '01 Bn.).—Waterford (Cappoquin and Lismore, Ht.).—Kerry (Kenmare, '98 Ht. 4).

Not uncommon in marshy places. Mr. Hardy found the type near Kenmare. The specimens from the remaining localities are referable to the variety *discoideus*, Steph.

T. lituratus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Armagh (Churchill, J.).—Galway (Clonbrock, D.).—King's County (Tullamore, '95 Ht. 5).—Wexford (Slaney estuary, Ht.).—Waterford (Cappoquin, Ht.).—Cork (Timoleague, Sp.).—Kerry (Dingle, Ht. ; Killarney, '71 S.).

Locally common—especially on boggy heaths.

T. darwinianus, Sharp.

ULSTER. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Dublin (shore near Dollymount, '00 Ht. 1 & 3).

Very local. Mr. Buckle found this interesting species, commonly on "grassy mounds, slightly above high-water mark at mouth of mountain rivers." On the Dublin coast, it is extremely local, occurring under stones and sea-weed close to the shore. This species was first described from the Scotch coast, but Dr. Sharp informs us that it has since been found in various localities in England, and on the Continent. It appears in the month of May, and would seem to be strictly an estuary insect.

T. figuratus, Mann.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Doagh, B.).—Armagh (J.).—Galway (Clonbrock, Ht.).—Westmeath (Mullingar dist., Ht.).—Dublin (Lucan, '00 Ht. 3).—Kildare (Maynooth, C.).—Wicklow (Glenmalur, '96 Ht. 1).—Kilkenny (Woodstock, Ht.).—Wexford (Courtown, Killoughrum, &c., Ht.).—Clare (Cratloe Wood, Ht.).—Limerick (dist., Ht.).

Rather common.

T. bicolor, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*T. hamorrhoidalis*, F. The records, Armagh ('92 J. 4), and Maynooth ('94 C. & Cr.), are to be referred to *T. figuratus*, Mann.]

T. paludosus, Fall.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim and Down (near Belfast, '85 H.; B.).—Enniskillen (Tempo, '97 L. 1).—Wicklow (Glenmalur Valley, '96 Ht. 1).—Kerry (Cloonee Lakes near Kenmare, Cs.).

T. flavilabris, Fall.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

T. thoracicus, Ol.

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Sligo, Westmeath, Dublin, Wicklow, Queen's County, Kilkenny, Wexford, Clare, Limerick, Cork, Kerry.

Locally common on sallows.

Rhagonycha unicolor, Curt.

MUNSTER.

Kerry (Killarney, '00 Ht. 4).

Found on oak by Mr. J. R. Hardy.

R. fuscicornis, Ol.

ULSTER.

Donegal (Buncrana, one specimen on willows, '95 Wr.).

***R. fulva*, Scop.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***R. testacea*, L.**

ULSTER. LEINSTER.

Antrim (Larne, '91 F. 1).—Down (near Belfast, '85 H.).
Dublin ('54 Hn.; Barnacullia, '92 C. 4).

We have not seen Irish specimens.

***R. limbata*, Thoms.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Roscommon,
Galway, Louth, Westmeath, Dublin, Kildare, Queen's County,
Wexford, Cork, Kerry.

Common.

***R. pallida*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*R. elongata*, Fall. The record, Foyle dist., ('00 B.), is due to an error, the preceding species was intended.]

***Malthinus punctatus*, Fourc.**

ULSTER. LEINSTER. MUNSTER.

Antrim, Down, Armagh, Louth, Dublin, Wicklow, Clare, Limerick,
Kerry.

Frequent.

***M. fasciatus*, Ol.**

LEINSTER. MUNSTER.

Louth (south, '00, Ht. 3).—Kilkenny (Thomastown, Ht.).—
Wexford (dist., Ht.).—Waterford (Glenshelane Valley and Lismore,
Ht.).—Cork (Glandore, Ht.).

Common in the south-east of Ireland.

***Malthodes marginatus*, Latr.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common and variable.

[*M. mysticus*, Kies. The record, Santry ('93 Ht. 3), is to be deleted.]

***M. flavoguttatus*, Kies.**

· ULSTER. MUNSTER.

Antrim (Carr's Glen, Ht., coll. B.).—Waterford (Glenshelane Valley near Cappoquin, Ht.).—Kerry (Kenmare, '98 Ht. 4).

***M. dispar*, Germ.**

MUNSTER.

Kerry (Torc Wood, Ht., coll. Cs.).

***M. pellucidus*, Kies.**

ULSTER. LEINSTER. MUNSTER.

Antrim (Carr's Glen, Ht., coll. B.).—Kilkenny (Woodstock, Ht.).—Waterford (Glenshelane Valley, Ht.).—Kerry (Derrycunihy Wood, Ht., coll. Cs.).

***M. minimus*, L.**

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Dublin (Taken by Mr. Tardy, '54 Hn.).—Kerry ("Killarney, old Kenmare Road," Fg. MS.).

These records require verification, as there may have been some confusion with the following species (*M. atomus*).

***M. atomus*, Thoms.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist.), Antrim, Down, Dublin, Wicklow, Kilkenny, Wexford, Clare (Cratloe).

***Malachius bipustulatus*, L.**

ULSTER. LEINSTER. MUNSTER.

Antrim (Rathlin, '97 Hr.).—Dublin (Lucan Demesne, '92 Ht.).—Queen's County (Abbeyleix, '01 Bn.).—Kenmare ('94 Ht. 4).

Very local. Rev. J. M. Browne obtained it abundantly on hawthorn blossoms.

[*M. viridis*, F. The record, Curraghmore ('97 Ws.), is to be referred to the preceding species.]

***Anthocomus fasciatus*, L.**

LEINSTER.

Wicklow (Fg. MS.).

Mr. Furlong's specimen is now in the Dublin Museum collection.

***Dasytes ærosus*, Kies.**

LEINSTER. MUNSTER.

Dublin (Santry, '93 Ht. 3).—Kildare (Maynooth, '94 C. & Cr.).—Kerry (Kenmare, '98 Ht. 4).

***Psilothrix nobilis*, Ill.**

ULSTER. LEINSTER. MUNSTER.

Antrim (near Belfast, J.).—Dublin (Rush, '93 Sp.; North Bull, '92 Bn.).—Wicklow ('92 Bn.; Kilcool and Greystones, Ht.; Arklow, '53 Fg.).—Wexford (sandhills south of Arklow Head, '57 H.).—Waterford (Tramore, J. & Ht.).—Cork (Rosscarbery, C.).—Kerry (Kenmare, '98 Ht. 4).

Local on the coast—sometimes abundant on the flowers of *Convolvulus soldanella* and *Taraxacum*.

[*Dolichosoma lineare*, Rossi. Rosscarbery ('95 C. 1). This record is to be deleted.]

CLERIDÆ.

***Thanasimus formicarius*, L.**

LEINSTER.

Dublin ("on the seashore, Dublin, by Mr. Bulwer," '39 Curtis; Grand Canal Docks, '00 Ht. 3), Wicklow ("Powerscourt Deerpark, in a decayed holly," Fg. coll.).

***Tillus elongatus*, L.**

MUNSTER.

Kerry (Kenmare, June, Fg. MS.).

***Neocrobia ruficollis*, F.**

ULSTER. LEINSTER. MUNSTER.

Antrim (Belfast, '91 F. 1).—Kilkenny ("imported with bones from England," Mr. Robertson).—Kerry (Kenmare, found in a window in the G. S. & W. Hotel, '98 Ht. 4).

***N. violacea* L.**

ULSTER. LEINSTER.

Down (near Belfast, '85 H.).—Dublin (local under bones, '54 Hn.; Kilruddery, Fg. coll.).

N. rufipes, De G.

ULSTER. LEINSTER.

Antrim (Larne and Belfast, '91 F. 1).—Dublin (Museum, coll. Nc.).
Taken by the Rev. Canon Bristow in Antrim.

PTINIDÆ.**Ptinus fur, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Tyrone, Armagh, Fermanagh,
Leitrim, Dublin, Wicklow, Kerry (Valentia and Kenmare).

Local; sometimes found in quantities in preserved goods.

Niptus hololeucus, Fald.

ULSTER. LEINSTER. MUNSTER.

Derry (Foyle dist., '00 B.).—Antrim (Cave Hill, '95 Ht. 4; Belfast, B.).—Armagh ('92 J. 4).—Fermanagh (Tempo, L.).—Dublin, ('54 Hn.).—Limerick (H. MS.).—Cork (Bn.).

Common in houses.

N. crenatus, F.

ULSTER. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Portballintrae, '94 T.).—Down (near Belfast, '85 H.).—Armagh ('92 J. 4; Poyntzpass, '00 J. 3).—Dublin ('54 Hn.; Roebuck and Donnybrook, '78 M.).

Hedobia imperialis, L.

MUNSTER.

Kerry (Kenmare, '98 Ht. 4).

Found in a thorn fence at Carrigacappeen by Mr. J. R. Hardy.

Mexium affine, Boield.

LEINSTER.

Louth (in an old fishing-tackle box, '00 Ht. 3).

Probably introduced.

Priobium castaneum, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Roscommon, Louth, Westmeath, Dublin, Wicklow, Waterford.

Locally common in old trees.

Anobium domesticum, Fourc.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in old houses. A Hymenopterous insect, *Spathius exarator*, is parasitic on this species (see '00 J. 5).

A. paniceum, L.

LEINSTER. MUNSTER.

Louth (south, '00 Ht. 3, coll. C.).—Dublin (Ht.; in vermicelli, Cr.).—Waterford (Tramore, in hotel, Ht.).

Ernobius mollis, L.

MUNSTER.

Kerry (Fg. MS.).

Ptilinus pectinicornis, L.

ULSTER. LEINSTER.

Fermanagh (Tempo, '97 L. 1).—Dublin (College Park, '54 Hn.; Artane, in an old tree stump, '00 Ht. 3, coll. Fn.).

Very local.

Ochina hederæ, Müll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Galway, Meath, Dublin, Wicklow, Kilkenny, Waterford, Kerry.

BOSTRICHIDÆ.

[*Rhisopertha pusilla*, L. "In wheat from Egypt" (H. MS.)]

LYCTIDÆ.

Lyctus canaliculatus, F.

MUNSTER.

Kerry (Kenmare, '98 Ht. 4).

Swept from amongst herbage by Mr. J. R. Hardy.

CISSIDÆ.

Cis boleti, Scop.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. hispidus, Payk.

LEINSTER.

Queen's County (Maryborough, Sp.).

C. bidentatus, Ol.

ULSTER. LEINSTER.

Armagh ('92 J. 4).—Dublin (Templeogue ; Phoenix Park, Ht.).
Locally abundant in fungi.

C. alni, Gyll.

CONNAUGHT.

Roscommon (Mote Park, '98 Ht. 1).

Found in a *boletus*. The record, Phoenix Park ('93 Ht. 3), is to
deleted.

C. nitidus, Herbst.

ULSTER. CONNAUGHT. LEINSTER.

Down (near Belfast, '85 H.).—Roscommon (Mote Park, '98 Ht. 1).
—Galway (Wr.).—Westmeath (Athlone dist., Ht.).—Dublin ('54 Hn. ;
Phoenix Park, '93 Ht. 3).—Carlow (Borris, '95 Ht. 8).—Kilkenny
(Thomastown, Ht.).—Wexford (Killurin, Ht.).

C. festivus, Panz.

LEINSTER. MUNSTER.

Carlow (Borris, Ht.).—Cork (Queenstown, under beech bark,
'95 Wr.).

Octotemnus glabriculus, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Ballycastle and Murlough Bay, Cs. & T.).—Armagh ('92
J. 4).—Mayo (Delphi, Ht.).—Galway (Wr.).—Dublin (Dundrum,
'00 Ht. 3).—Waterford ('78 P.).

Common where it occurs, in moss and fungi.

CERAMBYCIDÆ.

***Aromia moschata*, L.**

ULSTER. CONNAUGHT. MUNSTER.

Down (near Belfast, '85 H.).—Galway (Clonbrock, on a decaying willow, '98 Ht. 1, coll. D.).—Cork (coll. Pn.; Glengariff, Fg. coll.).—Kerry (Kenmare, '01 Ch., coll. Yr.; Killarney, coll. Wt.).

Local in old willows, and on flowers. The headquarters of the Musk Beetle would seem to be in the south-west, where it has been taken in some numbers in the Killarney and Glengariff districts. In other parts of the country it is of extremely rare occurrence. The species is very widely distributed on the Continent of Europe, ranging north as far as Finland, and it also occurs in Siberia.

***Hylotrupes bajulus*, L.**

CONNAUGHT.

Roscommon (Cloonca Wood, '98 Ht. 1).

A specimen taken by the Hon. R. E. Dillon in this locality, is now in the Dublin Museum collection.

***Clytus arietis*, L.**

ULSTER. MUNSTER.

Antrim (near Belfast, a specimen in the collection of the Belf. Nat. Hist. and Phil. Soc., taken by Mr. R. Templeton).—Kerry (Kenmare, '98 Ht. 4, coll. Hr.).

Very rare.

[*Neoclytus caprea*, Say. *N. erythrocephala*, Fab. Mr. P. B. Mason records ('97 Mn.) the capture in a Burton-on-Trent timber yard of these north American longhorns. The ash-tree in which they were found was said to have been felled at Carrick-on-Suir. In a recent letter Mr. Mason says "all efforts to trace the place where the tree was felled failed owing to the dealer who sold it having left. There seemed no doubt that the tree was Irish, but it had been for some time in a wood yard in Liverpool." Mr. C. W. Buckle has an example of *N. erythrocephala* obtained in a Belfast timber yard, October, 1901.]

Rhagium inquisitor, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Rathmullan, Wr.).—Derry (Walworth Wood, '00 B.).—Tyrone ('91 F. 1, coll. K.).—Down (Tollymore Park, J.).—Fermanagh (Ballinamallard).—Sligo ('91 F. 1, coll. K.).—Mayo ('91 F. 1; Crossmolina, K.).—Roscommon (Cloonca Wood, '98 Ht. 1).—Westmeath (Hare Island, Lough Ree, '00 Ht. 1).—Queen's County (Abbeyleix, '01 Bn.).—Cork (Glengarriff, Yr.).—Kerry (K.; Waterville, coll. Yr.; Muckcross, Fg. coll.).

Not uncommon on oak, beech, and hawthorn, in old woods in the north and west of Ireland, but rare in the east.

R. indagator, Gyll.

CONNAUGHT. LEINSTER.

Galway (Clonbrock, '98 Ht. 1, coll. D.).—Meath (Laytown, '94 D.N.F.C.).

The Laytown specimen was probably introduced with some logs which were lying near the place of capture. A northern insect occurring locally in Scotland, but very rarely elsewhere in Britain.

Distribution—northern and central Europe, Siberia.

R. bifasciatum, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Galway, Louth, Dublin, Wicklow, Carlow, Clare, Waterford, Cork, Kerry.

Common in fir plantations.

Pachyta collaris, L.

CONNAUGHT.

Roscommon (Cloonca Wood, '98 Ht. 1).

Taken by the Hon. R. E. Dillon.

Anoploclera sexguttata, F.

MUNSTER.

Kerry (Muckcross, '59 Bc.).

Two specimens of this local species, captured by Mr. Edwin Birchall near Muckcross Abbey, are now in Mr. J. R. Hardy's collection. Mr. Hardy also swept a male off flowers on Dinish Island, near Muckcross, in the summer of 1879.

***Leptura scutellata*, F.**

CONNAUGHT.

Galway (Clonbrock, '98 Ht.).

A single example taken by the Hon. R. E. Dillon on the "Sheep-pool Bog," near an extensive oak wood at Clonbrock. The species is rare, occurring in the New Forest and a few other localities in the south-east of England. Distribution—northern and central Europe (Reitter).

***L. fulva*, De G.**

CONNAUGHT.

Galway (Clonbrock, '98 Ht. 1, coll. D.).

***L. livida*, F.**

CONNAUGHT.

Roscommon (Mote Park, '98 Ht. 1).

***Strangalia aurulenta*, F.**

MUNSTER.

Cork (Glengariff, in Lord Bantry's Demesne, '91 F 1, coll. K.; Fg. MS.).

First taken in this locality many years ago by Mr. A. Furlong and Dr. E. P. Wright; and recently Mr. W. F. de V. Kane captured two examples in the same locality which he has kindly presented to the Dublin Museum. This fine species is very rare, Fowler mentions isolated localities in each of the following counties:—Sussex, Hants, Devon, and Glamorgan (Swansea), so that it would seem to have a south-western range in Great Britain. Reitter records it from central Europe.

***S. quadrifasciata*, L.**

MUNSTER.

Cork (Glengariff, in Lord Bantry's Demesne, '91 F. 1, coll. K.).

Twelve specimens taken in half-an-hour on ragweed, by Mr. W. F. de V. Kane.

***S. armata*, Herbst.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Sligo (Lough Gill, '01 D.N.F.C.).—Wicklow (Powerscourt, '54 Hn.; Devil's Glen, '57 H.; Dargle, '00 Ht. 3; Ovoca, Fg. MS.).—Carlow (plentiful in Mr. Kavanagh's

Demesne near Borris, coll. Freke).—Kilkenny (Thomastown and Woodstock, Ht.).—Cork (Glengariff, Fg. MS. ; K.).—Kerry (Killarney, '55 Hn. 2; Upper Lake and Kenmare, '98 Ht. 4; Waterville, coll. Yr.).

Local in wooded districts, occasionally in abundance on flowers of bramble.

S. melanura, L.

There is an Irish-taken example of this species in the Haliday collection.

Grammoptera tabacicolor, De G.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (near Belfast, 85 H.).—Roscommon (Mote Park, '98 Ht. 1).—Dublin (Glasnevin, &c., '54 Hn. ; Barnaculla, '94 C. 4).—Wicklow (Delgany, Sp.).—Queen's County (Abbeyleix, '01 Bn.).—Kilkenny (Woodstock, Ht.).—Waterford (Glenshelane Valley, Ht.).

Local.

G. analis, Panz.

ULSTER.

Down (near Belfast, '85 H.).

Leptura femorata of this reference—there is an Irish specimen in the Haliday collection.

G. ruficornis, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim, Down, Fermanagh, Roscommon, Galway, Westmeath, Dublin, Kildare, Wicklow, Kilkenny, Wexford, Clare, Limerick, Waterford, Cork, Kerry.

Common. The variety *pallipes*, Steph., is not uncommon.

[*Chion cinctus*, Dru.—“In April last I received from St. James's Gate Brewery, two specimens of a fine North American longhorn beetle (*Chion cinctus*), which had been found living in a barrel-stave made from timber, imported from the United States” ('95 Cr. 1).]

[*Acanthocinus ædilis*, L.—Antrim (Queen's Island, Belfast, '00 J. 4), Dublin (North Wall, a ♀, now in the Dublin Museum). Introduced. Not uncommon in Scotland where it is found amongst fir logs in the Tay, Dee, and Moray districts. The English localities recorded, point to importation.]

***Leiopus nebulosus*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Roscommon (Mote Park, '98 Ht. 1).—Galway (Clonbrock, '96 Ht. 2).—Dublin (Rathfarnham, '54 Hn.; Lucan demesne, on oak, '00 Ht. 3).—Queen's County (Abbeyleix, '00 Bn.).—Kilkenny (Woodstock, Ht.).—Clare (Cratloe Wood, coll. Nl.).—Waterford (Lismore, '95 Ht. 1).—Kerry (Killarney, '55 Hn. 2).

Occurs, as a rule, singly, on oak, chestnut, and other trees.

***Pogonochærus bidentatus*, Thoms.**

ULSTER. LEINSTER.

Armagh (Loughgall, '92 J. 4).—Wicklow (Glen of the Downs, '91 Bn. 1; '92 Bn.).—Ireland ('85 H.).

***P. dentatus*, Fourc.**

LEINSTER.

Dublin ('78 P.).—Wexford (Slaney bank near Killurin, Ht.).
Rare.

[*Monochammus confusor*, Kirby.—A single specimen of this species occurred in a garden near Belfast, having been introduced with timber. Some cocoons were noticed when the wood was broken up, and soon afterwards the perfect insect was captured near the same spot. Habitat, North America.]

[*M. sutor*, L.—There is a specimen of this longhorn in the Dublin Museum, marked Irish. It had been for many years in the collection of Trinity College. The species is found in northern and central Europe, but in Great Britain it is almost certainly an importation.]

BRUCHIDÆ.

[*Bruchus pisi*, L.—Cavan (imported with peas, '01 Cr. 1).—Dublin (Ht.)]

[*B. affinis*, Fröhl. Imported with beans from France ('99 Cr.).]

***Bruchus atomarius*, L.**

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '95 Ht. 4).—Armagh ('92 J. 4).—Louth (Braganstown, '95 Ht. 7).—Westmeath (Ht.).—Dublin (Ht.).—

Wexford (common, Ht.).—Clare and Limerick (Ht.).—Waterford (Cappoquin and Tramore, Ht.).—Cork (Fermoy, '95 Ht. 1).—Kerry (north, C.).

Common where it occurs, but somewhat local.

B. villosus, F.

LEINSTER. MUNSTER.

Wexford (Killoughrum Forest and Wexford dist., Ht.).—Waterford ('78 P.; Tramore, Ht.).—Kerry (Kenmare, '98 Ht. 4).
Locally abundant on broom.

CHRYSOMELIDÆ.

Donacia crassipes, F.

ULSTER. LEINSTER. MUNSTER.

Donegal (Milford, coll. Osb.; Coolmore, '95 J. 1).—Derry (Toome, coll. Wl.; mouth of the Ballinderry River at Lough Neagh, coll. Wl.).—Dublin (Taken by Mr. Tardy, '54 Hn.).—Kilkenny (R. Nore at Thomastown, Ht.).—Cork (Shepperton Lakes near Glandore, Ht.).—Kerry (Caragh lakes, Fg. MS.; Kenmare, '01 Ch., coll. Yr.).

Local, occasionally found in numbers on *Nymphæa*.

D. dentata, Hoppe.

MUNSTER.

Kerry (Crimcaun Lake on Cromaglaun Mountain, '98 Ht. 4).

Taken on *Nymphæa alba*, by Mr. H. G. Cuthbert. The record, Armagh ('88 J. 2), is to be referred to the following species.

D. versicolore, Brahm.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Milford, coll. Osb.).—Lough Neagh (H. MS.).—Armagh (Navan Fort, coll. Wl.; Clonmacate, J.).—Fermanagh (Templenew, near Belleek, '95 J. 1).—Sligo (Cs.).—Dublin (Glasnevin Gardens, '54 Hn.; Raheny Ponds, '00 Ht. 3; Terenure, Bn.).—Wicklow (near Blessington, '00 Ht. 3; Dundran and Arklow, Fg. MS.).—Wexford (Courtown, '92 C. 6).—Clare (Corrofin, coll. Gr.).—Cork (Fg. MS.).—Kerry (Fg. MS.; Killarney, '47 W. 1; Waterville, '01 Ch., coll. Yr.).

Local; on *Potamogeton* and other water-plants.

D. dentipes, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (Newcastle, Ch.).—Armagh ('89 J. 1).—Galway (Clonbrock, coll. D.).—Westmeath (common in drains near the southern shore of Lough Ennell, Ht.).—Wicklow (Arklow, Fg. MS.).—Limerick (Fg. MS.).

Very local.

D. limbata, Panz.

ULSTER. LEINSTER. MUNSTER.

Armagh ('88 J. 2).—Louth (Braganstown, '95 Ht. 7).—Dublin ('54 Hn.).—Wicklow (Arklow Fg. MS.).—Wexford (Ht.).—Cork (Rosscarbery, '95 C. 1; Glandore, Ht.; Blarney, Wr.).—Kerry (Waterville, '01 Ch., coll. Yr.).

D. bicolora, Zsch.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (Lagan Canal near Moira, B.).—Armagh (Maghera, on *Butomus*, '88 J. 2).—Roscommon (Mote Park, Ht.).—Westmeath (Lakes, common, Ht.).—Dublin (Portmarnock, '54 Hn.).—Kildare (Maynooth '94 C & Cr.).—Limerick (Lough Gur, Ht.).—Killarney ('91 F. 1).

D. obscura, Gyll.

LEINSTER. MUNSTER.

Westmeath (near Mullingar, Ht.).—Cork (Glengariff, '01, Ch., coll. Yr.).

Very local on water-plants in drains near Lough Ennell, and at Lough Drin, May, 1901. Distribution—northern and central Europe, Siberia

D. thalassina, Germ.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Derry (Foyle dist., '00 B.).—Galway (Clonbrock, D.).—Westmeath (Lough Ennell, Ht.).—Dublin (Royal Canal, '00 Ht. 3).—Wexford (River Slaney at Enniscorthy and Killurin, Ht.).—Clare Killaloe, '71 S.).—Limerick (Lough Gur, Ht.).—Kerry (Caragh Lake, coll. Yr.).

Not uncommon; probably overlooked in many localities.

D. impressa, Payk.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (J.).—Derry (Foyle dist., '00 B.).—Fermanagh (Belleisle, '98 Pr.).—Roscommon (Lough Ree and Mote Park, '98 Ht. 1).—Galway (Lough Derg, Ht.; Clonbrock, '96 Ht. 2).—King's County (Shannon at Clonmacnoise, '00 Ht. 1).—Carlow (Borris, '95 Ht. 8.).—Clare (Killaloe, '71 S.).—Cork (Lakes near Glandore, Ht.).

Locally common on boggy heaths, and lake shores, in the west of Ireland, but rare in the east.

D. simplex, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down, Armagh, Fermanagh, Galway, Westmeath, Dublin, Wexford, Kilkenny, Clare, Limerick, Waterford, Cork, Kerry.
Common.

D. vulgaris, Zsch.

ULSTER. LEINSTER.

Antrim (Lagan near Moira, B.).—Down (Strandtown, '00 J. 4).—Armagh (Lowry's Lough, '92 J. 4).—Westmeath (Lough Derravaragh, Ht.).—Dublin (Royal Canal, Raheny, and Crumlin quarries, '00 Ht. 3).

Local; usually found singly.

D. clavipes, F.

CONNAUGHT. MUNSTER.

Roscommon (Lough Ree, '98, Ht. 1).—Clare (Dromoland Castle, Ht., coll. D.).

Apparently a scarce species in Ireland; in the first locality a single example occurred on a reedy islet near the middle of the lake.

D. semicuprea, Panz.

MUNSTER.

Kerry (Crimcaun Lake, near Killarney, '98 Ht. 4).

Taken on *Nymphæa alba*, by Mr. Cuthbert. The record, Armagh, ('92, J. 4), should refer to *D. simplex*, F.

D. cinerea, Herbst. (*D. hydrocharidis*, H. MS.).

ULSTER.

This species is included on the strength of a note in the Haliday MS. list, indicating that it was found at Lough Neagh by Mr. T. V. Wollaston, the specimens having been seen by Mr. Haliday.

D. sericea, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Not common.

D. discolor, Panz.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common; often found at a distance from water, especially on heaths, and of much more frequent occurrence than the preceding species.

D. braccata, Scop.

LEINSTER. MUNSTER.

Wexford (Salt marsh on the Slaney bank, near Killurin, Ht.).—Kerry (Banks of tarn on Cromaghlaun Mountain, near Killarney, '59 Bc.; Kenmare, and Dinish Island, '98 Ht. 4, coll. Hr.).

Abundant in the Wexford locality on *Phragmites*. In Great Britain this local species seems confined to the southern counties of England. Widely distributed throughout the Palearctic region.

D. affinis, Kunze.

ULSTER.

Donegal (Portsalon, St.).—Ireland (H. coll.).

Very rare.

Hæmonia appendiculata, Panz.

LEINSTER.

Meath ("Hill of Down, in the canal, in *Potamogeton*, Dr. Allman," H. MS.).—Dublin (Royal Canal, '93 Ht. 1).

Early in April, 1893, one of us captured a specimen of this rarity in the Royal Canal near Dublin, and from time to time it has occurred near the same place, but always in small numbers. There seems no doubt that these Dublin specimens are *H. appendiculata*, an opinion in which we are supported by Mr. G. C. Champion. Compared with *H. Curtisi*, which is found in brackish-water, they are larger

(6.5 mm.) with slightly longer thorax, longer and more sharply pointed spines at the apex of the elytra, which are more deeply striated, the femora also are distinctly clavate. In fresh examples the extreme apices of the femora and tibiae are often tipped with black. It seems probable that this beautiful insect has been carried down by the Royal Canal from one of the Westmeath Lakes, as has almost certainly been done in the case of *Corixa Bonsdorffi* and other aquatic animals. The colouring of *H. appendiculata* renders its detection very difficult, as it closely resembles the water-plants to which it clings. Reitter records this species from central Europe, and it is also included in the Scandinavian list, Siberia (Heyden). In England it has only been recorded from a few localities in the east.

Lema cyanella, L.

ULSTER. LEINSTER.

Down (near Belfast, '85 H.)—Dublin (Firhouse, '54 Hn.).

Recorded as *L. puncticollis* in these references, but the specimens cannot be traced. *L. septentrionis*, Weise, may have been mistaken for this species.

L. lichenis, Voet.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

L. septentrionis, Weise.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Milford, coll. Osb.).—Antrim and Down (Ballycastle, '00 J. 4; common on the Ballycastle dunes, Cs. & T.; Belfast dist., B.; Bangor, '95 Wr.).—Galway (H. coll.).—Louth (south, '00 Ht. 3).—Westmeath (Lough Ennell, Ht.).—Dublin (Santry, '93 Ht. 2; Howth).—King's County (Clonmacnoise, '00 Ht. 1).—Wexford (Ferns, '97 D. N. F. C.; Forth Hills, Ht.).—Waterford ('78 P.).—Cork (Queenstown and Middleton, '95 Wr.).

Not uncommon in meadows, but rather local. Mr. C. W. Buckle obtained it plentifully on young shoots of oats, in company with its larva, in the month of July. There are two varieties of this insect found in Britain—one with the thorax pitchy black found only in Ireland; the other with metallic green thorax, and relatively broader elytra, found in the south of England (see '97 Ch. 1). Abroad this species has been recorded from Berlin and central Sweden. In some of the earlier references this insect has been recorded as *L. Erichsoni*, Suffr.

L. melanopa, L.

LEINSTER.

Dublin (Rathfarnham Park, '54 Hn.).

Taken by Mr. A. Furlong, and seen by Mr. Haliday (*vide* H. MS.).

The specimens cannot be traced.

Cryptocephalus aureolus, Suffr.

According to a note in Haliday's MS. list, he obtained "*C. sericeus*" in Ireland. Although no authority is mentioned, this is probably meant for the species known as *C. aureolus* in present catalogues. Unfortunately, no definite locality is given, but the letter—C—after the name may indicate "west of Connaught."

C. labiatus, L.

MUNSTER.

Kerry (Killarney, H. MS.).

Taken in this locality by Mr. Haliday.

Lamprosoma concolor, Sturm.

CONNAUGHT. LEINSTER. MUNSTER.

Galway ('91 F. 1, coll. Wr.).—Dublin ('78 P.; Woodlands, '95 Ht. 3).—Kilkenny (Woodstock, Ht.).—Waterford (Cappoquin and Lismore, Ht.).—Cork (Glengariff, '01 Ch. 1, coll. Yr.).—Kerry (Kenmare, '98 Ht. 4; Parknasilla, coll. Sch.).

Rather common in the south.

Timarcha tenebricosa, F.

MUNSTER.

Tipperary (south, Wt.).—Waterford (Tramore sands, '53 Fg.; a dead specimen in June, Ht.; Stradbally, Jn.).

Extremely local—though it occurs in great abundance on the Waterford coast. Found as far north as the midlands in England. Abroad it inhabits central and southern Europe (Reitter).

T. violaceonigra, De G.

ULSTER. LEINSTER. MUNSTER.

Antrim (Colin Glen, in the dry bed of the river, coll. Orr.).—Down near Belfast, '85 H.).—Dublin (Taken by Mr. Tardy '54 Hn.).—Waterford ("in numbers at one spot at Glencorran where a small stream had cut a passage through the cliffs," '97 C.).

Chrysomela sanguinolenta, L.**MUNSTER.**

Cork (Rosscarbery, Ch., coll. C.).

Swept off underwood in an alder plantation at Benduff, by Mr. H. G. Cuthbert.

[*C. marginalis*, Duft. The record, Rosscarbery ('95 C. 1), should have referred to the preceding.]

C. Banksi, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. staphylea, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. polita, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Galway, Dublin, Wicklow, Kilkenny, Wexford, Clare, Waterford.

Locally common.

C. orichalcia, Müll.**LEINSTER.**

Meath (Kells, Sch.).—Dublin (Clonskeagh, '54 Hn.; Roebuck and Clontarf, '78 M.; Dundrum, Bk.).

Scarce.

C. varians, Schall.

ULSTER. CONNAUGHT. MUNSTER.

Donegal (Foyle dist., '00 B.; Milford, coll. Osb.).—Antrim (Rathlin, '97 Hr.).—Sligo (Glencar, Cs.).—Mayo (Ballinakill, coll. Fn.).—Galway (Leenane, Ht.).—Clare (Cratloe Wood, Ht.).—Waterford (Glenshelane Valley, Ht.).—Cork (Glandore, Ht.).—Kerry (Kenmare and Killarney, '98 Ht. 4).

Not uncommon in the south and west; most of the specimens are referable to the green variety.

C. fastuosa, Scop.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., on dead nettle, '00 B.; Milford, coll. Osb.; Coolmore, '95 J. 1).—Fermanagh (Tempo, '97 L. 1).—Roscommon

(Roosky, C.).—Wexford (Courtown, '92 C. 6).—Clare (Trough, found in a sack of flour, coll. N.).

Local.

C. CEREALES, L.

Mr. Haliday in his MS. list notes the finding of this species on "Knockmeledown Hill, Tipperary," by Mr. Hely. This beautiful insect is widely distributed in Europe and Siberia, but it is extremely local in Great Britain, occurring only in the neighbourhood of Snowdon. The food plant, Wild Thyme, grows in the botanical district which includes the Knockmealdown Mountains (District II.), but the Irish specimens cannot be traced.

C. hyperici, Först.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim (Ballycastle), Armagh, Fermanagh, Cavan, Galway, Westmeath, Wicklow, Wexford, Clare, Waterford.

Local; on *Hypericum*.

Melasoma seneum, F.

MUNSTER.

Kerry (Kenmare, '98 Ht. 4).

Three specimens found on willow in Saint Finan's Graveyard by Mr. J. R. Hardy.

Phytodecta olivacea, Först.

MUNSTER.

Kerry (Kenmare, '98 Ht. 4).

On gorse and broom, near the Cloonee Lakes.

P. pallida, L.

MUNSTER. LEINSTER.

Derry (coll. Milne).—Down (Rostrevor, bred from larvæ found on elm, Ht.).—Wicklow (Poulaphouca, '91 Bn. 1).

Locally abundant on hazel and elm.

Gastroidea viridula, De G.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

G. polygoni, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Portsalon, '95 Ht. 4).—Down (near Belfast, '85 H.).—Armagh (Lowry's Lough, '92 J. 2).—Galway ('96 Ht. 6).—Louth

(Greenore, '93 D.N.F.C.).—Dublin (Santry and Tallaght, '94 Ht. 3; Deansgrange, C.).—Kerry (Dingle, under stones on the shore, Ht.).

***Plagiodera versicoloreæ*, Laich.**

MUNSTER.

Kerry (Kenmare Wood, '98 Ht. 4, coll. C.).

***Phædon tumidulus*, Germ.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. armoraciæ*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Coolmore, '94 J. Ht. Cr.).—Down (near Belfast, '85 H.).—Armagh ('92 J. 4).—Galway (Woodford, Ht.).—Westmeath (Lough Ennell, Ht.).—Dublin (Portmarnock, Ht.).—Wicklow (Brittas Bay, Ht.).—Wexford (common, Ht.).—Cork (Queenstown, '95 Wr.; Roscarbery, '95 C. 1).—Kerry (Killarney, '71 S.).

***P. cochleariæ*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Phylloocta vulgatissima*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Tyrone, Armagh, Fermanagh, Roscommon, Galway, Westmeath, Wicklow, Wexford, Limerick, Waterford.
Common on willows.

***P. cavifrons*, Thoms.**

ULSTER.

Armagh ('96 J. 1).

Under willow bark : the specimen has unfortunately been lost.

***P. vitellinæ*, L.**

ULSTER. CONNAUGHT. LEINSTER.

Tyrone (Ardree, '88 J. 2).—Down (near Belfast, '85 H.).—Armagh ('91 J. 2).—Fermanagh (Tempo, L.).—Sligo (J.).—Galway (Clonbrock, Ht.).—Westmeath (Athlone and Mullingar dists., Ht.).—Dublin ('54 Hn.).

***Hydrothassa aucta*, F.**

LEINSTER.

Dublin (Taken by Mr. Tardy, '54 Hn.).

***H. marginella*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Prasocuris junci*, Brahm.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down, Armagh, Fermanagh, Sligo, Galway, Louth, Dublin, Wexford, Cork, Kerry.

***P. phellandrii*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster, Sligo, Dublin, Wicklow, Carlow, Wexford, Cork, Kerry.

***Phyllobrotica quadrimaculata*, L.**

ULSTER. MUNSTER.

Antrim (Ballycastle, Fg. MS.).—Lough Neagh ('59 Bc.).—Armagh (Coney Island, Lough Neagh, '88 J. 2).—Cork (Blarney Lake banks, H. MS.).—Kerry (Muckcross, '59 Bc.; Cloonee Lakes near Kenmare, '98 Ht. 4, coll. Hr.).

Very local.

***Lochmæa capreæ*, L.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Coolmore, '95 J. 1).—Antrim (Cranmore, '85 Pn.).—Down (near Belfast, '85 H.; Newcastle, '00 J. 3).—Dublin ('54 Hn., recorded with a query).—Clare (south, Ht.).—Cork (Hungary Hill, '94 J. Ht. C.).—Kerry (Killarney, Fg. MS.; Kenmare, '98 Ht. 4).

On willows; not common.

***L. suturalis*, Thoms.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***L. cratægi*, Först.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Derry (Foyle dist., '00 B.).—Armagh ('92 J. 4; Poyntzpass, '98 J.).—Roscommon (Mote Park, '98 Ht. 1).—Galway (Wr.).—Westmeath (Mullingar dist., Ht.).—Dublin ('54 Hn.; Portmarnock, '00 Ht. 3).—Queen's County (Abbeyleix, Bn.).—Waterford ('78 P.; Dromana Forest, Ht.).

Locally common, on flowers of hawthorn in early summer and on the foliage in autumn.

***Galerucella viburni*, Payk.**

CONNAUGHT. LEINSTER.

Galway (Clonbrock, '98 Ht. 1, coll. Cr. & D.).—Queen's County (Abbeyleix, '01 Bn.).

Common on the Guelder-Rose at Clonbrock.

***G. nymphææ*, L.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Down, Armagh, Fermanagh, Westmeath, Dublin, King's County, Clare, Limerick, Cork.

On *Persicaria*, &c.: not so common as the following species.***G. sagittariæ*, Gyll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***G. lineola*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***G. calvariensis*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (south), Armagh, Fermanagh, Galway (L. Derg), Louth, Wexford, Waterford, Kerry.

***G. tenella*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Adimonia tanacetii*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster; and has been found in the counties of Sligo, Galway, Westmeath, Dublin, Queen's County, Wexford, Clare, Cork, Kerry.

***Sermyla halensis*, L.**

ULSTER.

Donegal (Portsalon, Sn.).

***Longitarsus ater*, F.**

ULSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Ballycastle,

Cs.; Lisburn, injuring flax, Cr.).—Down (near Belfast, '85 H.).—**Armagh** ('92 J. 4; Poyntzpass, '97 J. 2).—Cavan (Ballyhaise, '94 J. Ht. Cr.).—Waterford ('78 P.).

The flax crop in Co. Down suffered severely from attack of this beetle in 1827 ('38 Pn). See also Journal of Dept. Agriculture and Technical Instruction, vol. ii., pp. 138-140.

[*L. pulex*, Schr. The record, Armagh ('88 J. 2), is to be referred to the preceding species.]

L. holsaticus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Ballycastle, T.).—Armagh ('88 J. 2).—Roscommon (Mote Park, '98 Ht. 1).—Galway ('95 Ht. 6; Clonbrock, Ht.).—Kildare (Athy, H. MS.).—Wicklow (Glendalough, H. MS.).—Limerick (dist., Ht.).—Waterford ('78 P.).

L. luridus, Scop.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

L. brunneus, Duft.

ULSTER. MUNSTER.

Armagh ('91 J. 3; '92 J. 4).—Waterford ('78 P.).

L. suturellus, Duft. (var. *fuscicollis*, Steph.).

ULSTER.

Armagh (Ch., coll. J.).

The record, Cultragh Lough ('94 J. Ht. Cr.), is to be referred to *L. piciceps*, Steph.

L. atricillus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Ballycastle, T.).—Down (near Belfast, '85 H.).—Armagh (Lowry's Lough J.).—Galway (Woodford, Ht.).—Dublin ('54 Hn.).—Waterford ('78 P.).

L. patruelis, All.

LEINSTER.

Dublin (Dundrum, Ch., coll. Bk.).

The record, Armagh ('92 J. 4), should refer to *L. melanocephalus*, All.

L. melanocephalus, All.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

L. atriceps, Kutz.

ULSTER.

Armagh (J.).

A single specimen referred doubtfully to this species by Mr. G. C. Champion. The record, Coolmore ('96 J.), is to be deleted.

[*L. distinguendus*, Rye. The record, Coolmore ('94 J. Ht. Cr.), is to be deleted.]

L. suturalis, Marsh.

ULSTER. CONNAUGHT.

Donegal (Foyle dist., '00 B.; Ardara, '92 J. 3).—Armagh (J. Poyntzpass, '97 J. 2).—Galway (Aran Island, '93 Bn.).

L. picioeps, Steph.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Armagh, Fermanagh, Cavan, Galway (Roundstone and Inis M'Dara), Dublin, Queen's County, Wexford, Limerick.

L. ballotæ, Marsh.

ULSTER.

Donegal (Foyle dist., '00 B.).

A single specimen taken by sweeping grasses in July.

L. femoralis, Marsh.

ULSTER. LEINSTER. MUNSTER.

Donegal (? Foyle dist., '00 B.).—Louth (Carlingford, J.).—Dublin ('00 Ht. 3).—Kerry (Killarney, 47 W. 1).

The record, Armagh ('92 J. 4), is to be referred to a variety of *melanocephalus*, All.

L. pusillus, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim (Ballycastle), Armagh, Cavan, Galway, Dublin, Waterford.

Common.

***L. jacobæ*, Wat.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common on ragweed.

***L. ochroleucus*, Marsh.**

CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Cranmore, J., coll. Tn.).—Louth (Carlingford, J.).—Galway (Clifden, Wr.).—Dublin (Killiney, on *Ononis arvensis*, '54 Hn.; Royal Canal near Lucan, and North Bull, Ht.).—Kerry (Killarney, '47 W. 1).

Local.

***L. gracilis*, Kuts.**

ULSTER. LEINSTER. MUNSTER.

Donegal (common), Derry, Antrim, Armagh, Cavan, Dublin (coast), Waterford.

***L. laevis*, Duft.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Bundoran, '91 J. 1; Ardara, '92 J. 3; Coolmore, J.).—Louth (Carlingford, J.).—Dublin (coast, '00 Ht. 3; Dundrum Ch., coll. Bk.).—Waterford ('78 P.).

***L. pellucidus*, Foudr.**

ULSTER. CONNAUGHT. MUNSTER.

Donegal (Foyle dist., '00 B.; Bundoran, '92 J. 1; Ardara, J.).—Derry (Foyle dist., '00 B.).—Galway (Oughterard, '95 Ht. 6).—Clare (Ballyvaughan, '95 Ht. 6).—Limerick (Ht.).

Some of these records should possibly refer to the preceding species.

[*Haltica lythri*, Aubé. Doubtful as an Irish species. The record, *H. eruca* ('85 H.), was very probably founded on specimens of *H. ericeti*, All.: to which species the record, Queenstown ('95 Wr.), is to be referred.]

***Haltica ericeti*, All.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (south), Antrim, Cavan, Roscommon, Galway, Westmeath, Kilkenny, Wexford, Clare, Limerick, Waterford, Cork, Kerry.

Locally common on heaths.

H. oleracea, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.; "Newcastle, June, 1846," E., coll. H.).—Armagh (Churchill, '95 J. 2).—Roscommon (Mote Park, '93 Ht. 1).—Galway (Clonbrock, '96 Ht. 2).—Westmeath (Lough Ennell, Ht.).—Dublin (Dodder banks, '54 Hn.).—Wexford (Courtown, C.).—Waterford (Ardmore, coll. C.).—Kerry (Dingle, E., coll. Ht.).

There is a black variety (var. *nigra*, Weise) in the Haliday collection, labelled Newcastle.

H. palustris, Weise.

ULSTER. LEINSTER. MUNSTER.

Armagh (E., coll. J.).—Wexford (Courtown, E., coll. C.).—Kerry (Killarney, Cs.).

Very rare—a single specimen only occurred in each of these localities. The records, Mote Park and Mount Talbot ('98 Ht. 1), are to be referred to *H. erioeti*, All.

H. pusilla, Duft.

MUNSTER.

Waterford ('78 P.).—Kerry (Glencar, '99 Sch. & Cr.).

The records, Dublin ('78 M.) and Courtown ('92 C. 6), are to be deleted.

Hermæophaga mercurialis, F.

LEINSTER.

Wexford (Courtown, '92 C. 6).

Phyllotreta nodicornis, Marsh.

MUNSTER.

Limerick (" *Haltica antennata*, common on *Roseda*, near Limerick —A. Furlong!" H. MS.)

P. nigripes, F.

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Dublin (Glasnevin and Portmarnock, '54 Hn.; Howth, '91 F. 1; Dundrum, Ht., coll. Bk.).—Waterford ('78 P.).

***P. consobrina*, Curt.**

LEINSTER.

Dublin ('99 Cr.; Kingstown, '00 Ht. 3).

Mr. G. H. Carpenter reports this species as having been injurious in the summer of 1898 when "appearing in vast numbers they almost destroyed plantations of cabbages, turnips, and carrots in various parts of Dublin." It had been previously noticed as an injurious insect in the south of England. (Ent. Month. Mag., XXIII., p. 92).

***P. punctulata*, Marsh.**

LEINSTER. MUNSTER.

Dublin ('92 B.).—Waterford (Rathkurby, '91 F. 1; not in '78 P.).

***P. atra*, Payk.**

CONNAUGHT. LEINSTER. MUNSTER.

Galway (Woodford, Ht.).—Wexford (Courtown, Killoughrum, Slaney Estuary, Ht.).—Waterford ('78 P.; Lismore, Ht.).

Common in the south-east.

***P. undulata*, Kuts.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. nemorum*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. Notices of injury done to crops by this species will be found in the following references ('91 Cr.; '96 Cr.; '97 Cr.; '00 Cr.).

***P. flexuosa*, Ill.**

LEINSTER.

Wexford (Killoughrum Forest, Ht.).

A single specimen occurred in a marshy place in this locality, May, 1899. Identification verified by Mr. Champion.

***P. sinuata*, Steph.**

MUNSTER.

Waterford ('78 P.).

[*P. tetrastigma*, Com., Armagh ('88 J. 2, and '91 J. 3). These records are to be referred to the following species.]

***P. exclamationis*, Thunb.**

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Armagh ('92 J. 4).—Dublin ('54 Hn.).—Wicklow (Blessington, Ht.).—Kilkenny (Thomastown, Ht.).—Cork (Queenstown, '95 Wr.).—Kerry (Rossbehy, Fg. MS.; Kenmare, Ht.).

***Aphthona lutescens*, Gyll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down, Armagh, Sligo, Mayo, Roscommon, Galway, Westmeath, Kilkenny, Clare, Limerick, Cork, Kerry.
Common in the south and west.

***A. nonstriata*, Goeze.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Abundant on *Iris*.***A. venustula*, Kuts.**

LEINSTER.

Dublin (Portmarnock, '56 Hn.).

A specimen from this locality is in the Holiday collection.

***A. virescens*, Foudr.**

MUNSTER.

Waterford (*A. hilaris*, '78 P.).***A. atratula*, All.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Ballintoy, Ht., coll. Cs.).—Galway (Woodford, common, Ht.).—Dublin, (Portmarnock, H. coll.).—Waterford (Rathkurby, '91 F. 1).

Locally common.

***Batophila rubi*, Payk.**

LEINSTER.

Dublin (local, '54 Hn.; Dodder Bank, H. coll.).—Wicklow (Avondale, '97 Ht. 2).—Kilkenny (Thomastown, Ht.).—Wexford (Ferns, Killoughrum, common, Ht.).

***Sphaeroderma testaceum*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Mayo, Louth, Westmeath, Dublin, Kilkenny, Wexford, Limerick, Waterford, Cork, Kerry.

***S. cardui*, Gyll.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Coolmore, '94 J. Ht. Cr.; Bundoran, '91 J. 1).—Derry (Magilligan Point, B.).—Antrim (Ballycastle, Cs. and T.).—Dublin (Howth, Sp.).—Waterford ('78 P.).

***Apteropoda orbiculata*, Marsh.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Dublin, Carlow, Wexford, Waterford.

***A. globosa*, Ill.**

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—King's County (Seagull Bog, '95 Ht. 5).—Waterford (Cappoquin, Ht.).

***Mniophila muscorum*, Koch.**

ULSTER. CONNAUGHT.

Antrim (Ballycastle, common, Cs.; Colin Glen, coll. Wl.).—Down (Rostrevor, Fg. coll.).—Sligo (Glencar, Cs.).

Taken by Mr. Furlong "in moss on top of large stones in bed of torrent" (H. MS.).

***Podagrica fuscipes*, L.**

ULSTER.

Down (near Belfast, '85 H.).

In the Haliday collection.

***Mantura chrysanthemi*, Koch.**

ULSTER. LEINSTER.

Armagh (Vicar's Cairn, '88 J. 5; Newtown Hamilton, '91 J. 2).—Wicklow (Woodenbridge, Fg. coll.).

Rare, taken in moss on high ground.

[*Ochrosia salicariae*, Payk. The records, Armagh ('89 J. 1), and Carlingford ('91 F 1), are to be deleted.]

Crepidodera transversa, Marsh.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. ferruginea, Scop.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. rufipes, L.

ULSTER. LEINSTER.

Antrim and Down (near Belfast, B.; '85 H.).—Armagh ('92 J. 1).—Dublin (Lucan, '94 Ht. 3).

Local.

C. ventralis, Ill.

MUNSTER.

Waterford ('78 P.).

The records, Bundoran ('91 J. 1), Coolmore ('94 J. Ht. Cr.), Armagh ('92 J. 4), Stormount ('00 J. 4), are to be referred to *C. ferruginea*, Scop.

C. helxines, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common on willows.

C. aurata, Marsh.

ULSTER.

Donegal (Buncrana, '95 Wr.).—Antrim (Portmore, coll. Orr.).—Down (near Belfast, '85 H.).

The record, Armagh ('89 J. 1), is to be referred to a variety of *C. helxines*, L.

Hippuriphila Modeeri, L.

LEINSTER. MUNSTER.

Dublin (Portmarnock, '54 Hn.).—Limerick (near Limerick, and at Doonassa, coll. Nl.).

Taken by Mr. Arthur Neale in the Limerick district, August, 1895.

Chaetocnema hortensis, Fourc.

ULSTER. LEINSTER. MUNSTER.

Donegal ("Glenbegh," Fg. MS.).—Antrim (Ballycastle, T.).—Louth (C.).—Dublin ('54 Hn.).—Wicklow (Avondale, '97 Ht. 2).—

Wexford (Ferns, '97 D.N.F.C. ; Killoughrum, Killurin, Slaney estuary, common, Ht.).—Waterford ('78 P.).—Kerry (Muckruss, Fg. MS. ; Kenmare, Ht.).

Common in the south-east.

C. Sahlbergi, Gyll.

LEINSTER.

Wexford (Ht.).

A single example taken by sweeping in a marsh on the Slaney bank near Wexford, July, 1900. Identification confirmed by Mr. G. C. Champion.

Plectroscelis concinna, Marsh.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, and often destructive to turnip crops.

Psylliodes attenuata, Koch.

MUNSTER.

Waterford ('78 P.).

P. chrysocephala, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, has occurred plentifully on turnips in County Tyrone. The variety *anglica*, F., has been recorded from—Donegal (Foyle dist., '00 B.).—Antrim (Portballintrae, '94 T.).—Down (near Belfast, '85 H.).—Waterford (78 P.), and the variety *nucea*, Ill., from Wexford (Courtown, '92 C. 6).

P. napi, Koch.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. A small brightly coloured variety is not uncommon.

P. cuprea, Koch.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Portballintrae, '94 T. ; Templepatrick, B.).—Down (Newcastle, Ch.).—Armagh ('92 J. 4).—Mayo (Achill, Ht.).—Louth (C.).—Westmeath (Lough Ennell, Ht.).—Dublin (Portmarnock, '94 Ht. 3 ; Raheny, Ht.).—Waterford ('78 P.).

Rather common; the *hyoscyami* of the Belfast and Dublin lists is to be referred to the present species.

***P. affinis*, Payk.**

[ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Down (near Belfast, '85 H.).—Mayo (Ballina, '71 S.).—Dublin (Rochestown, '54 Hn.; Santry, Ht.).—Clare (Killaloe, '71 S.).—Waterford ('78 P.).—Kerry (Killarney, '47 W. 1; Kenmare, '98 Ht. 4).

***P. marcida*, Ill.**

CONNAUGHT. LEINSTER.

Sligo (Enniscrone, J.).—Dublin (Portmarnock, '54 Hn; North Bull, '00 Ht. 3).

Locally common on sandhills, on low plants.

***P. dulcamaræ*, Koch.**

MUNSTER.

Waterford ('78 P.).

[*P. chalcomera*, Ill. The records, Armagh ('92 J. 4), and Courtowna ('92 C. 6), are to be deleted.]

***P. picina*, Marsh.**

ULSTER. CONNAUGHT.

Armagh ('92 J. 4; Lough Neagh, J.).—Fermanagh (Templenew, '95 J. 1; Belleisle, '98 Pr.).—Roscommon (Mote Park, '98 Ht. 1).

Not common, but probably occurs in many other localities.

***Cassida vibex*, F.**

ULSTER. CONNAUGHT. MUNSTER.

Fermanagh (Marble Arch Glen, off thistles, Cs.).—Galway (Woodford, Ht.).—Kerry (Killarney, '71 S.).

Rather common on the shores of Lough Derg near Woodford.

***C. sanguinolenta*, F.**

LEINSTER.

Carlow (Borris, '95 Ht. 8).

A single specimen taken under moss on the Barrow bank in April.

C. nobilis, L.

ULSTER. LEINSTER. MUNSTER.

Down (Strangford Lough, '55 H. 1).—Louth (Carlingford and Greenore, '88 J. 1.).—Clare (Ballyvaughan, '95 Ht. C.).

Locally plentiful on the coast, on *Honckeneya peploides*, *Cochlearia*, and under stones.

C. flaveola, Thunb.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Frequent, but not met with in numbers.

C. equestris, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim, Down, Armagh, Fermanagh, Mayo, Roscommon, Galway, Westmeath, Dublin, Carlow, Wexford, Clare, Limerick, Waterford, Cork, Kerry.

Common on *Mentha*.

C. viridis, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. hemisphærica, Herbst.

ULSTER. LEINSTER. MUNSTER.

Donegal (Kilderry, '00 B.).—Antrim (Gortconny Bog near Ballycastle, Cs.).—Wexford (Courtown sandhills on *Iris*, Ht.).—Cork ('55 H. 1; Monkstown, coll. Ws.).

This species is apparently very local, but we have no doubt it will eventually be found in many intermediate localities.

TENEBRIONIDÆ.

***Blaps mucronata*, Latr.**

ULSTER. LEINSTER. MUNSTER.

Antrim, Down, Armagh, Dublin, Cork, Kerry.

Common in cellars and outhouses. The *B. mortisaga* of old lists is to be referred to the present species.

Crypticus quisquilus, L.

ULSTER. LEINSTER.

Belfast (district, '91 F. 1, not included in Haliday's list—'85 H).
—Dublin (Portmarnock, '54 Hn.; Sutton, '94 Ht. 3; Lambey, '96 C.).

Heliopathes gibbus, F.

ULSTER. LEINSTER. MUNSTER.

Down (Downpatrick, coll. Wl.; Newcastle, '91 F. 1; near Ard-glass, coll. Pt.).—Meath (near the Boyne mouth, '94 D.N.F.C.).—Dublin (Portmarnock, '54 Hn.; Rush, '93 Sp.; Donabate, '95 Ht. 3).—Wexford (Rosslare sandhills, Ht.).—Waterford (Tramore, Ht.).—Cork (Rosscarbery, '95 C. 1).

Local; on sandhills.

Opatrum sabulosum, Gyll.

MUNSTER.

Kerry (Kenmare, '98 Ht. 4).

Found in numbers by Mr. J. R. Hardy under an old sack on the shore of Kenmare Bay.

Microzeum tibiale, F.

LEINSTER.

Dublin (Rush, '93 Sp.).

Taken on the sandhills by Mr. W. E. Sharp.

Phaleria cadaverina, F.

LEINSTER. MUNSTER.

Louth ('94 C. 1).—Wicklow (Arklow sands, Fg. coll.).—Waterford (Tramore, Fg. coll.).

Very local. Elsewhere this species is found on the coasts of England—chiefly in the south and west, Wales, Lancashire, France, and southern Europe.

Tenebrio molitor, L.

ULSTER. LEINSTER.

Antrim (Belfast, in timber yard, B.).—Dublin ('00 Ht. 3).
In flour stores, and houses.

T. obscurus, F.

ULSTER. LEINSTER. MUNSTER.

Down (there is a specimen in the collection of the Belfast Nat. Hist. & Phil. Soc., labelled "In dry flour, Comber Mills, 1860; the beetle appeared in August").—Dublin (in stable, '54, Hn.; in flour stores, '01 Cr.).—Limerick (in flour, Ht.).

Tribolium ferrugineum, F.

LEINSTER.

Dublin (Taken by Mr. Tardy, '54. Hn.).

Palorus melinus, Herbst.

MUNSTER.

Kerry (Golf-links, near Ballybunion, '98 C.).

Found under bark on a paling.

Helops pallidus, Curt.

ULSTER. LEINSTER. MUNSTER.

Antrim (Portballintrae, in August, '94 T.).—Wexford (Courtown, '93 C. 4).—Waterford (Tramore sands, Ht.).—Cork (Rosscarbery, '95 C. 1).

Found at the roots of marram-grass on sandhills, at a depth of two or three inches below the surface. Mr. Tomlin's specimens were very variable in size. The range of this species in Great Britain almost exactly corresponds with that of *Phaleria cadaverina*, and on the Continent it inhabits the northern coast of France.

H. striatus, Fourc.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim, Down, Galway, Louth, Dublin, Wicklow, Carlow, Wexford, Waterford, Cork, Kerry.

Common on heather on high ground, and under fir-bark.

Cistela luperus, Herbst.

ULSTER.

Derry (Magilligan sands, '00 B.).

A single example found in a sand-pocket during a strong wind.

LAGRIDÆ.**Lagria hirta, L.**

ULSTER. LEINSTER. MUNSTER.

Derry (Foyle dist., '00 B.).—Louth (Braganstown, '95 Ht. 7).—Dublin (Portmarnock and Killiney, '54 Hn.).—Wexford (Courtown, '92 C. 6; S.E. coast, common, Ht.).—Clare and Limerick (Ht.).—Waterford ('78 P.; Lismore, '95 Ht. 1; Tramore).—Cork (Kanturk and Bantry Bay, '47 W. 1; Queenstown, Wr.).—Kerry (Kenmare, '98 Ht. 4; Valentia, Yr.).

Rather local, commoner in the south.

MELANDRYIDÆ.**Orchesia micans, Panz.**

MUNSTER.

Kerry (Kenmare, '98 Ht. 4, coll. Hr.).

Bred in numbers from a fungus found growing on birch.

Glinochara undulata, Kr.

MUNSTER.

Kerry (Kenmare, '98 Ht. 4, coll. Hr.).

A single specimen found in a "mass of fungus-grown leaves."

Conopalpus testaceus, Ol.

Two specimens taken by Mr. Tardy (*vide* H. MS.). These are now in the Dublin Museum and Trinity College collections, and are marked as having been found in Ireland. The species is rare in Great Britain, occurring chiefly in the dead branches of trees in which the larva lives.

Melandrya caraboides, L.

LEINSTER.

Dublin (Malahide, '54 Hn.).—Wicklow ("Powerscourt Deerpark, June 24, in rotten thorn stump plentifully," Fg. coll.).

Very local.

[*Abdera bifasciata*, Marsh. The record, Glencullen ('92 C. 4), is to be deleted.]

PYTHIDÆ.

***Salpingus castaneus*, Panz.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Derry (Foyle dist., '00 B.).—Armagh (J.; Poyntzpass, J.).—Galway (Clonbrock, '96 Ht. 2).—Dublin (Rush, '94 C. 2; Santry, '94 Ht. 3).—Cork (Kanturk, '47 W. 1).

***S. seratus*, Müll.**

ULSTER. LEINSTER.

Antrim (Cave Hill, Ch., coll. B.).—Dublin (Blanchardstown and Tibbradden, '94 Ht. 3).

The record, Armagh ('91 J. 2), is to be referred to the preceding species.

***S. ater*, Payk.**

LEINSTER.

Dublin ('78 P.).

***Lissodema quadripustulata*, Marsh.**

MUNSTER.

Kerry (Killarney, beaten off oak near the Upper Lake, '98 Ht. 4).

***Rhinosimus ruficollis*, L.**

ULSTER. CONNAUGHT. LEINSTER.

Antrim (Ballycastle, T.).—Down (Tollymore Park, '85 Pn.).—Lough Neagh (H. MS.).—Armagh ('88 J. 5).—Fermanagh (Belleisle, Pr.).—Mayo (Westport, '91 F. 1, coll. Wr.).—Dublin (Santry, '94 Ht. 3).

Locally common, under bark.

***R. viridipennis*, Steph.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Roscommon (Mount Talbot, '98 Ht. 1).—Dublin (Santry, '94 Ht. 3; Dundrum, under elm bark, '00 Ht. 3).—Kerry (Kenmare, '98 Ht. 4).

***R. planirostris*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Derry, Antrim, Down, Armagh, Galway, Dublin, Wexford, Cork, Kerry.

CEDEMERIDÆ.**Cedemera lurida**, Marsh.**MUNSTER.**

Kerry (Muckross, '59 Bc. ; Kenmare, '98 Ht. 4).

"One specimen found by Mr. Rogers on a wall near Kenmare; and a few more near the same spot by Mr. Hardy."

Naoerdes melanura, Schmidt.**ULSTER. LEINSTER.**

Donegal (Foyle dist., '00 B.).—Dublin (Glasnevin Botanic Gardens, on *Scrophularia*, '54 Hn. ; Dundrum and Phoenix Park, Ht.).

Local.

Ischnomera sanguinicollis, F.

Ireland ('82 St. ; '39 Curtis).

There are Irish examples of this species in the collections of the Dublin Museum and Trinity College. According to Haliday's MS. list, this species was taken by Mr. J. Tardy in Ireland.

PYROCHROIDÆ.**Pyrochroa serraticornis**, Scop.**MUNSTER.**

Limerick (Adare, Fg. and H. MSS.).

Taken in Adare Demesne by M. Furlong.

MORDELLIDÆ.**Anaspis frontalis**, L.**ULSTER. CONNAUGHT. LEINSTER. MUNSTER.**

Common.

[*A. Garneysi*, Fowler. The record, Dublin ('93 Ht. 3), is to be deleted.]

A. rufilabris, Gyll.**ULSTER.**

Donegal (Rathmullan, Ch., coll. B.).—Antrim (Lagan Canal near Lisburn, Ch., coll. B.).—Armagh (Ch., coll. J.).

A. Geoffroyi, Müll.

MUNSTER.

Kerry (Kenmare, '98 Ht. 4).

Found on privet by Mr. J. R. Hardy.

A. ruficollis, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

A. subtestacea, Steph.

ULSTER.

Antrim (Cullybacky, '91 J. 2).

A. maculata, Fourc.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

ANTHICIDÆ.

Anthicus humilis, Germ.

LEINSTER.

Wexford (sea coast, H. MS.).

A. floralis, L.

ULSTER. LEINSTER. MUNSTER.

Donegal, Down, Armagh, Fermanagh, Westmeath, Dublin, Wicklow, Cork.

The variety *quisquilius*, Thoms., is not uncommon.

A. scoticus, Rye.

ULSTER. LEINSTER.

Antrim (Lough Neagh shore, near Shanes Castle, coll. B.).—Louth (Greenore, '88 J. 1 & '96 J. 1).

Abundant on low plants on the beach at Greenore, and crawling on the shingle.

MELOIDÆ.***Meloe proscarabeus*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist.), Down, Dublin, Wicklow, Queen's County, Carlow, Clare, Waterford, Cork.

Frequent in grassy places in spring.

Var. *cyaneus*, Muls.

Donegal (Ballyargus, '00 B.).

Taken on sunny bank in the month of March.

***M. violaceus*, Marsh.**

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Dublin (Roebuck, Merrion, '54 Hn.; Howth, M.).—Wicklow (Ovoca, coll. Sch.).—Carlow (Borris, coll. Fe.).—Kerry (Waterville, '01 Ch., coll. Yr.).

Rare.

***Lytta vesicatoria*, L.**

CONNAUGHT.

Roscommon (Cloonca Wood, '98 Ht. 1).

A single specimen taken in this locality by the Hon. R. E. Dillon, on mountain ash, in the summer of 1897. This handsome species is of such rare and sporadic occurrence in Great Britain that many entomologists consider it to be a rather doubtful native. The probability is that it is indigenous, but must be ranked as one of those common European species which are of extreme rarity in the British Isles. All of the recorded English localities are in the south-eastern counties.

ANTHRIBIDÆ.***Choragus Sheppardi*, Kirby.**

LEINSTER.

Dublin (Templeogue, '00 Ht. 3, coll. Fn.)

CURCULIONIDÆ.

***Rhynchites senevirens*, Marsh.**

LEINSTER.

Louth (Castlecoo, swept from bramble, '92 C. 5).—Dublin ('92 C. 5; Skerries, '93 C. 1).

Specimens cannot be traced.

***R. minutus*, Herbst.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Derry (Foyle dist., '00 B.).—Down (near Belfast, '85 H.).—Armagh (Poyntzpass, '97 J. 4).—Galway (Clonbrock, '96 Ht. 2).—Kilkenny (Thomastown, Ht.).—Wexford (Killoughrum, Rosslare, common, Ht.).—Waterford (Ardmore, '97 C.; Cappoquin and Lismore, Ht.).—Cork (Glengarriff, '01 Ch., coll. Yr.; Queenstown, '95 Wr.; Glandore, Ht.).

Common in the south.

***R. interpunctatus*, Steph.**

LEINSTER.

Dublin ('54 Hn.).—Ireland ('85 H.).

Inserted on the strength of the *R. alliarie* of these references, but we are unable to trace the specimens.

***Deporatis betulæ*, L.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Foyle dist., '00 B.).—Armagh (Coney Island, Lough Neagh, '95 J. 4; Churchill, '88 J. 2).—Fermanagh (Tempo, '97 L. 1).—Roscommon and Galway (common, Ht.).—Dublin ('54 Hn.).—Wicklow (Glenmalur, '96 Ht. 1).—Wexford (Killoughrum, &c. Ht.).

Locally common on birch.

***Apion craccæ*, L.**

ULSTER. LEINSTER. MUNSTER.

Down (near Belfast, '85 H.).—Westmeath (Athlone, Fg. MS.).—Wicklow (Bray, '54 Hn.).—Kerry (Ballybunion, '98 C.; Milltown on the south shore of Dingle Bay, '55 Hn. 2).

Rare. The record, Armagh ('88 J. 2), is to be deleted.

A. cerdo, Thoms.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Moira, B.).—Armagh ('92, J. 4).—Galway (Woodford, Ht.).—Carlow (Borris, '95 Ht. 8).—Kilkenny (Thomastown, Ht.).—Wexford (dist., Rosslare, &c., Ht.).—Clare (Cratloe Wood, Ht.).—Waterford (Tramore, Ht.).—Kerry (Killarney, '68 Sh.).

A. subulatum, Kirby.

ULSTER. LEINSTER. MUNSTER.

Antrim, Down, Armagh, Cavan, Louth, Dublin, Wexford, Kilkenny, Limerick, Clare, Waterford, Cork, Kerry.

Abundant in the south-east.

A. ulicis, Forst.

CONNAUGHT. LEINSTER.

Galway (Clonbrock and Woodford).—Meath (Laytown, Ht.).—Westmeath (Mullingar, Ht.).—Dublin (Friarstown Glen, '93 Ht. 2; Portmarnock, &c., Ht.).—Carlow (Borris, '95 Ht. 8).—Wexford (Killoughrum, Ht.).—Kilkenny (Thomastown, Ht.).

Common on furze.

A. miniatum, Germ.

LEINSTER. MUNSTER.

Louth (south, '92 C. 5).—Dublin (Malahide, '54 Hn.; Portmarnock, Ht.).—Carlow (Borris, '70 Ft.).—Wexford (Courtown, '93 C. 4; Killurin, Rosslare, common, Ht.).—Waterford ('78 P.; Ardmore, '97 C.; Lismore, Cappoquin, and Tramore, Ht.).—Cork (Queenstown, '95 Wr.; Glandore, Ht.).—Kerry (Dingle, Ht.).

Common in the south-east. The record, Armagh ('88 J. 2), is to be referred to the following species.

A. cruentatum, Walt.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Ardara, '92 J. 3).—Armagh ('92, J. 4; Poyntzpass, J.).—Cavan (Cultragh Lough, '94 J. Ht. Cr.).—Kilkenny (Thomastown, Ht. 9).—Wexford (common, Ht.).—Limerick (Ht.).—Waterford ('78 P.; Lismore, '95 Ht. 1).—Cork (Queenstown, '95 Wr.).

***A. hæmatodes*, Kirby.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Cavan, Dublin, Limerick, Clare, Waterford, Cork, Kerry.

Common.

***A. rubens*, Steph.**

LEINSTER. MUNSTER.

Dublin (Woodlands near Lucan, '00 Ht. 3).—Cork (Queenstown, Wr.).

***A. pallipes*, Kirby.**

Down (near Belfast, '85 H.).

***A. rufirostre*, F.**

LEINSTER.

Dublin ('54 Hn.; Portmarnock and Raheny, Ht.).—Wexford (Ardcavan Sandhills, Ht.).

The record, Coolmore ('94 J. Ht. Cr.), is to be deleted.

***A. viciss*, Payk.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***A. apricans*, Herbst.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*A. Bohemani*, Thoms. The records, Coolmore, Cavan ('94 J. Ht. Cr.), and Ardara ('92 J. 3), are to be referred to *A. apricans*, Herbst.]

***A. trifolii*, L.**

MUNSTER.

Cork (Queenstown, '95 Wr.).

***A. dichroum*, Bedel.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***A. nigritarse*, Kirby.**

ULSTER. LEINSTER. MUNSTER.

Antrim (Carrickfergus, Wr.).—Dublin ('54 Hn.).—Cork (Queenstown, '95 Wr.).—Ireland ('85 H.).

[*A. confusus*, Kirby. The record, Armagh ('91 F. 1), is to be deleted.]

***A. stolidum* Germ.**

LEINSTER.

Meath (Laytown sandhills, '00 Ht. 3).

***A. senecum*, F.**

ULSTER. LEINSTER.

Down (near Belfast, '85 H.).—Dublin (Portmarnock, '54 Hn.; '95 Ht. 3; Lucan and North Bull, Ht.).—Wexford (Ardcavan sands, Ht.).

Locally common, especially on sandhills.

***A. radiolus*, Kirby.**

ULSTER. LEINSTER.

Armagh (Maghera, Lough Neagh, J.).—Louth (Greenore, J.).—Meath (Laytown, '94 D.N.F.C.).—Dublin ('54 Hn.; Portmarnock, '95 Ht. 3).—Wexford (Ardcavan, Ht.).

***A. onopordi*, Kirby.**

LEINSTER.

Dublin (Donabate sands, '95 Ht. 3).

***A. carduorum*, Kirby.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*A. flavimanum*, Gyll. The record, Ardara ('93 J. 1), is to be deleted.]

***A. virens*, Herbst.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***A. pisi*, F.**

ULSTER. LEINSTER. MUNSTER.

Antrim, Down, Armagh, Louth, Dublin, Kilkenny, Waterford, Kerry.

***A. æthiops* Herbst.**

ULSTER. LEINSTER. MUNSTER.

Antrim and Down (Carrickfergus, Wr.; Belfast dist., B.).—Dublin (Portmarnock, '95 Ht. 3; Templeogue, H. coll.).—Waterford ('78 P.; Lismore, Ht.).—Kerry (Aghadoe, Cs.).

***A. striatum*, Kirby.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Armagh, Fermanagh, Sligo, Galway, Dublin, Wicklow, Wexford, Clare, Limerick, Waterford, Cork, Kerry.

Common on furze, often in company with *A. scutellare*, Kirby.

***A. immune*, Kirby.**

ULSTER. LEINSTER.

Armagh (Lowry's Lough, '88 J. 2).—Wexford (Killoughrum, Enniscorthy, Forth Hills, common, Ht.).

***A. ervi*, Kirby.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***A. vorax*, Herbst.**

ULSTER. LEINSTER. MUNSTER.

Donegal (Coolmore, '94 J. Ht. Cr.).—Derry (Foyle dist., '00 B.).—Antrim (Portballintrae, '94 T.; Ballycastle, Cs.).—Down (near Belfast, '85 H.; Holywood, H. coll.).—Armagh ('92 J. 4).—Dublin ('54 Hn.).—Wexford (Rosslare, Ht.).—Waterford ('78 P.).

Not common.

***A. Gyllenhali*, Kirby.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

One of our commonest *Apions*—apparently not so abundant elsewhere in Britain.

***A. scutellare*, Kirby.**

CONNAUGHT. LEINSTER. MUNSTER.

Mayo (Wesport, Sp.).—Dublin (Phoenix Park, '54 Hn.).—Wicklow (Bray, Ht.).—Wexford (Forth Hills, Ht.).—Cork (Glendore, Ht.).—Kerry (Kenmare, '98 Ht. 4).

A. loti, Kirby.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

A. seniculum, Kirby.

LEINSTER. MUNSTER.

Louth (Carlingford, '94 J. Ht. Cr.).—Dublin (Portmarnock, '95 Ht. 3).—Kilkenny (Thomastown and Woodstock, Ht.).—Wexford (Ht.).—Waterford ('78 P.; Tramore, Ht.).

Local. The record, Armagh ('91 F. 1), is to be deleted.

[*A. tenuis*, Kirby. The record, Armagh ('88 J. 2), is to be deleted.]

A. marchicum, Herbst.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Cavan (Cultragh Lough, '94 J. Ht. Cr.).—Galway (Clonbrock, '96 Ht. 2).—Dublin (Donabate, Ht.).—Waterford (Tramore, Ht.).—Cork (Glandore, Ht.).—Kerry (Cloonee, Cs.).

A. violaceum, Kirby.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

A. hydrolapathi, Kirby.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

A. humile, Germ.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*Otiorrhynchus tenebricosus*, Herbst. Dublin (Baldoyle, on hedges, '54 Hn.).—Very doubtful, the Baldoyle district has been repeatedly searched for this insect, but without success. In our opinion specimens of *O. auropunctatus* must have been mistaken for the present species, as it occurs commonly on hedges near Baldoyle (see '00 Ht. 3).]

Otiorrhynchus auropunctatus, Gyll.

ULSTER. LEINSTER.

Derry (Culmore, one specimen at the foot of an oak, near a privet hedge, '00 B.; on bramble near Derry, coll. Bk.).—Louth ('95 Ch.;

Termoneckin and Carlingford, '95 Cr. 2; Newtown and Blackhall, C.).—Meath ('95 Ch.; Laytown, '95 Cr. 2).—Dublin ('95 Ch.; Santry, Raheny, Portmarnock, Donabate, '95 Cr. 2; '00 Ht. 3; Skerries, C.).—Wicklow (Ballybrood, '00 Sr.).

Locally common on hedges from March to October. The headquarters of this interesting weevil would seem to be in the counties of Dublin, Meath, and Louth, where it is locally abundant on mixed-hedges of hawthorn, ash, and privet, as a rule not far from the coast. Mr. Cuthbert has taken it on beech and alder. Abroad this insect has only been recorded from France (Auvergne), and the Pyrenees, and up to the present time it has not been found in either England or Scotland. Mr. G. C. Champion informs us that he has taken it commonly on the Pyrenees, on hedges, and under stones, at elevations between 2000 and 7000 feet.

***O. atroapterus*, De G.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

All round the coast in suitable localities, and abundant.

***O. blandus*, Gyll.**

ULSTER. CONNAUGHT. MUNSTER.

Donegal (Greencastle, '00 B.; Buncrana, '95 Wr.).—Derry (Magilligan, '00 B.).—Antrim and Down (Belfast dist., B.; Kilkeel, at roots of *Thymus serpyllum*, '75 Ch. 1; Helen's Bay, abundant, B.).—Sligo (Glencar, Cs.).—Mayo (Achill, '98 Ht. 2).—Galway (Kilkerran Bay, Wr.; Gentian Hill and Inishmore, '95 Ht. 6; Roundstone and Inish Mac Dara, Ht.).—Clare (Lahinch, coll. Gr.).—Waterford (Ardmore, '97 C.).—Cork (Rosscarbery, '95 C. 1; Bantry).—Kerry (Ballybunion, '98 C.; Dingle, Beginnish, and Valentia, Ht.; Sybil Head and Great Blasket, '55 Hn. 2; Waterville, '01 Ch., coll. Yr.).

Locally common under stones on the coasts of the north, west, and south, but we cannot find any record of its occurrence on the eastern side of the island between the counties of Down and Waterford. Common in Scotland, but it has not been recorded from England. Elsewhere this species seems recorded only from Lapland.

***O. maurus*, Gyll.**

ULSTER. CONNAUGHT.

Derry (Calry Glen and Kilderry plantation, '00 B.).—Down (Slieve Donard, '75 Ch. 2).—Mayo (Slievemore, Achill Island, '98 Ht. 2; Croagh Patrick, Wr.).

Mountain summits—under stones. Mr. C. W. Buckle once found it by sweeping grass close to the seashore. Distribution—northern and mountain districts in Europe, and in N. America. The records of this species in the following references should have referred to *O. auropunctatus*, Gyll. ('92 C. 5; '93 C. 1; '94 Ht. 3; '94 D.N.F.C.).

O. scabrosus, Marsh.

ULSTER. LEINSTER. MUNSTER.

Donegal (Portsalon, Sn.).—Antrim (Portballintrae, '94 T.; Carrickfergus, Wr.).—Down (near Belfast, H. MS.).—Louth (Newtown, '92 C. 5).—Dublin (Dundrum, '54 Hn.; Howth and Killiney, Ht.).—Wexford (Courtown, '97 C. 4).—Limerick (Fg. MS.).—Waterford ('78 P.; Ardmore, '97 C.).—Cork (Queenstown, Wr.).

Not common.

O. ligneus, Ol.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

O. picipes, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

O. sulcatus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common—this species has been found injuring Cyclamen roots ('91 Cr.), and vines ('00 Cr.). From its habit of feeding at night the insect often escapes notice when causing injury in greenhouses.

O. rugifrons, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Fermanagh, Sligo, Mayo, Galway, Louth, Meath, Dublin, Clare, Waterford, Cork, Kerry.

Common on the coast, especially in the west. It occurs on Achill, Inishmore, Great Blasket, Beginish, Valentia, and the islets off the Dublin coast.

O. ovatus, L.

ULSTER. LEINSTER. MUNSTER.

Antrim (Toome, Ht. coll. Wl.).—Dublin ('54 Hn.; Donabate, '95 Ht. 3; Portmarnock, '00 Ht. 3; Rush, Sp.).—Waterford (Lismore and Cappoquin, Ht.).—Cork (Skibbereen, Fg. MS.).

Local. The record, Brittas Bay ('96 D.N.F.C.), should refer to the following species.

***O. muscorum*, Bris.**

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Antrim (near Carrickfergus, '00 J. 4; Belfast dist., B.).—Down (Newcastle, '97 J. 1; '00 J. 3).—Dublin (Portmarnock, '00 Ht. 3).—Wicklow (Brittas Bay, Ht.).—Wexford (Courtown, Rosslare, Killurin, Ht.).

Common.

***Trachyploeus squamulatus*, Ol.**

MUNSTER.

Waterford ('78 P.).

***T. scaber*, L.**

LEINSTER. MUNSTER.

Dublin (Tallaght, '00 Ht. 3).—Waterford ('78 P.).—Cork (Glandore, Ht.).

***T. scabriculus*, L.**

LEINSTER.

Louth (south, '92 C. 5).—Dublin (Taken by Mr. Tardy, '54 Hn.). The specimens cannot be traced.

***Cænopsis fissirostris*, Walt.**

MUNSTER.

Kerry (Kenmare, '98 Ht. 4).

Taken by sweeping in the Kenmare demesne, July, 1898. This insect would seem to have a south-western range in Europe. The only localities mentioned by Reitter are—Britain, France, and Germany.

***C. Waltoni*, Schön.**

ULSTER. LEINSTER. MUNSTER.

Armagh (Loughgilly, J.).—Wicklow (Avoca, '00 Ht. 3).—Waterford (Ht., coll. Nl.).—Cork (Castle Cor, '47 W. 1; Glandore, Ht.).—Kerry (Ballybunion, '98 C.; Kenmare, '98 Ht. 4).

Local—rather common in the south-west.

***Strophosomus coryli*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

S. capitatus, De G.

LEINSTER. MUNSTER.

Wexford (Killoughrum Forest, Ht.).—Waterford (Cappoquin, Ht.).

Locally common in these localities on hazel.

S. retusus, Marsh.

ULSTER. LEINSTER. MUNSTER.

Down (Tollymore Park; Newcastle, '00 J. 4).—Louth (south, at roots of *Anthyllis*, '92 C. 5).—Wexford (dist., Ht.).—Waterford ('78 P.; Lismore and Cappoquin, Ht.).—Cork (Queenstown, on furze-blossom, '95 Wr.; Rosscarbery, '95 C. 1; Glandore, Ht.).—Kerry (Dingle dist., '55 Hn. 2; Kenmare, '98 Ht. 4).

Common in the south.

Exomias araneiformis, Schr.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

Brachysomus echinatus, Bond.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Whitehead, B.).—Roscommon (Mote Park, '98 Ht. 1).—Louth (Castlecoo, '92 C. 5).—Westmeath (Hare Island, Lough Ree, '00 Ht. 1).—Dublin (local, '00 Ht. 3).—Kerry (Ballybunion, '98 C.).

Local in woods.

Sciaphilus muricatus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

Tropiphorus tomentosus, Marsh.

ULSTER. LEINSTER.

Antrim (Ballycastle, Cs.; Carrickfergus, Wr.; Cave Hill, B.).—Down (near Belfast, '85 H.).—Meath (Laytown, Ht.).—Dublin ('54 Hn.; Dundrum, '95 Ht. 4; Portmarnock, Dalkey, &c.).

Local. The record, Borris ('95 Ht. 8), is to be referred to *T. obtusus*, Bond.

[*T. carinatus*, Müll. The records, Armagh ('91 J. 2; '92 J. 4), are to be referred to the following species.]

***T. obtusus*, Boned.**

ULSTER. LEINSTER.

Derry (Kilderry, '00 B.).—Armagh ('00 Ht. 2, coll. J.).—
Carlow (Borris, '00 Ht. 2).—Kilkenny (Thomastown, Ht.).

Rare—a northern species. The only locality mentioned by
Fowler, is Dumfries. Reitter records it from north and central
Europe, and Italy.

***Barypeithes sulcifrons*, Boh.**

ULSTER. LEINSTER. MUNSTER.

Antrim (Cave Hill, '95 Ht. 4).—Down (Bangor, '95 Wr.).—
Dublin ('92 Bn.; Woodlands, '94 Ht. 3; Howth, '95 Ht. 3; Tallaght,
&c.).—Carlow (Borris, '95 Ht. 8).—Kilkenny (Thomastown and Wood-
stock, Ht.).—Wexford (dist., Ht.).—Waterford (Cappoquin and Tra-
more, Ht.).—Kerry (Ballybunion, '98 C.).

Rather common.

***Liophloeus nubilus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster. Roscommon, Galway, Dublin, Wicklow,
Wexford, Waterford, Cork, Kerry, and probably general.

***Polydrusus micans*, F.**

ULSTER. LEINSTER.

Derry (Walworth Wood, '00 B.).—Antrim (Cullybacky, J.).—
Down (near Belfast, '85 H.).—Dublin (Taken by Mr. Tardy, '54
Hn.).—Carlow (Borris, Freke).—Wexford (Killoughrum Forest,
Ht.).

Very local, on hazel.

***P. tereticollis*, De G.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Roscommon, Galway, King's County, Kilkenny,
Wexford, Clare, Limerick, Waterford.

Locally common in woods, often in company with *P. corvinus*, L.

***P. pterygomalis*, Boh.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

[*P. flavipes*, De G. The records, Glasnevin Gardens ('54 Hn.;
'78 M.), are to be referred to *P. pterygomalis*.]

***P. cervinus*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Roscommon, Galway, King's County, Wicklow, Clare, Limerick, Waterford, Cork, Kerry.

Locally common on birch and willows.

***P. chrysomela*, Ol.**

LEINSTER.

Dublin (Baldoyle, '94 Ht. 3.).

Found under stones in one very restricted locality on the shore close to Sutton Common. It probably lives on *Artemisia* which grows in the vicinity. In Great Britain this species is found chiefly on the south-western coasts, but ranges north to the Solway District. Recorded from France, Spain, and Lusitania (Reitter).

***Phyllobius oblongus*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. calcaratus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Fermanagh (Tempo, L.).—Roscommon (Mote Park, '98 Ht. 1).—Galway (Clonbrock, Ht.).—Westmeath (Derravaragh, Ht.).—Dublin ('54 Hn.).—Kildare (Maynooth, '94 C. & Cr.).—King's County (Clonad Wood, '95 Ht. 5).—Wexford (Slaney Valley, near Ennis-corthy, Ht.).—Cork (Glengariff, '01 Ch., coll. Yr.).

***P. pyri*, L.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal (Foyle dist.; '00 B.).—Antrim (near Belfast, Orr.).—Armagh (Churchill, J.).—Roscommon (Mote Park, abundant on *Myrica gale*, '98 Ht. 1).—Galway (Tuam).—Westmeath (Derravaragh, Ht.).—King's County (Clonad Wood, '95 Ht. 5).—Wexford (Killoughrum Forest, Ht.).

Locally common, especially on heaths.

***P. argentatus*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***P. pomonæ*, Ol.**

ULSTER. LEINSTER. MUNSTER.

Fermanagh (Tempo, '97 L. 1).—Dublin (Portmarnock, '94 Ht. 3; Lucan, Ht.).—Wicklow (Delgany, Greystones, Sch.; Murrough, C.).—Waterford (Lismore, Ht.).

***P. viridisæris*, Laich.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Philopeton geminatus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. A remarkable form, much larger than the type, and with white scales, occurs on the coasts of Donegal and Antrim; at Ardara, in the former county, none of the ordinary form were present. At Bun-crana Mr. Walker notes "some of the females very large and almost white in colour."

***Atactogenus exaratus*, Marsh.**

LEINSTER.

Wicklow (Arklow marsh, Fg. MS.).—Ireland (H. coll.).

The records, Ardara ('92 J. 3), Ballintoy ('96 J. 2), and Armagh ('91 F. 1), are to be referred to the large white form of the preceding species.

***Barynotus obscurus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***B. Schönherri*, Zett.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster. Galway, Dublin, Wicklow, Queen's County, Wexford, Clare, Limerick, Waterford, Kerry.

Frequent.

***B. elevatus*, Marsh.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Louth, Dublin, Wicklow, Limerick.

Not common.

***Alophus triguttatus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Frequent, though rather local; abundant in the south-west.

Sitones griseus, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Sligo, Mayo, Louth, Longford (Inchcleraun, Lough Ree), Dublin, Kerry, Waterford (Tramore).

Not common—usually found on the coast sandhills.

S. cambricus, Steph. var. *cinerascens*, Fahr.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Down (Rostrevor, Fg. coll.).—Armagh (Loughgilly, J.).—Cavan (Lough Oughter, '94 J. Ht. Cr.).—Wexford (Enniscorthy, Ht.).—Waterford ('78 P.; Cappoquin, Ht.).—Cork (Queenstown, '95 Wr.).

Local. Mr. C. W. Buckle once found it in great abundance on a log of wood on the shore of Lough Foyle. All the Irish specimens that we have seen are to be referred to the variety *cinerascens*, Fahr.

S. regensteinensis, Herbst.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common on furze.

S. Waterhousei, Walt.

LEINSTER. MUNSTER.

Wexford (a specimen taken by sweeping, on the south bank of the Slaney Estuary near Wexford, Ht.).—Waterford ('78 P.; cliffs near Tramore, Ht.).

[*S. crinitus*, Herbst. Requires confirmation as an Irish species. The records, Belfast ('91 F. 1), and Baldoyle ('78 M.), may be due to confusion in synonymy. Mr. Cuthbert records it from Louth ('92 C. 5), but the specimens are not now in his possession.]

S. lineellus, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist. '00 B.; Buncrana, '95 Wr.; Coolmore, J.).—Antrim (B.).—Down (near Belfast, '85 H.; B.).—Mayo (Achill, '98 Ht. 2).—Galway (Roundstone, Ht.).—Dublin (Portmarnock, '54 Hn.; South Bull, Bk.).—Wexford (Rosslare, Ht.).—Cork (Glandore, Ht.).—Kerry (Ballybunion, '98 C.).

Locally common on sandhills.

S. tibialis, Herbst.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

S. hispidulus, F.

ULSTER. LEINSTER. MUNSTER.

Antrim, Down, Armagh, Cavan, Louth, Meath, Dublin, Kilkenny, Waterford, Kerry.

Frequent.

[*S. humeralis*, Steph., Greenore ('96 J. 2). This record it to be deleted.].

[*S. meliloti*, Walt. The record, Foyle dist. ('00 B.), is to be referred to *S. ononidis*, Sharp.].

S. flavescens, Marsh.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

S. puncticollis, Steph.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Milford, coll. Osb.).—Armagh ('92 J. 4).—Fermanagh (Belleisle, '98 Pr.).—Galway (Woodford, Ht.).—Louth (Greenore, J.; South, '92 C. 5).—Dublin (Portmarnock, Ht.).—Waterford ('78 P.).

Not common.

S. suturalis, Steph.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Buncrana, '95 Wr.).—Armagh ('92 J. 4; Poyntzpass, '97 J. 1).—Wexford (Courtown, '92 C. 6; Killurin, Ht.).—Cork (Queenstown, Wr.).

S. ononidis, Sharp.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., Ch., coll. B.).—Westmeath (Derravaragh, Ht.).—Wexford (Ardcavan, Ht.).—Waterford (Tramore, Ch., coll. Ht.).

S. lineatus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

S. sulcifrons, Thunb.

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Cavan, Westmeath,
Dublin, Kilkenny, Wexford, Waterford, Cork, Kerry.

Hypera punctata, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Down, Armagh, Fermanagh, Sligo, Louth, Meath,
Dublin, Kilkenny, Wexford, Waterford, Cork, Kerry.

Common.

H. fasciculata, Herbst.

ULSTER.

Donegal (Portsalon, Sn.).

H. rumicis, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common, often in numbers on *Rumex*.

H. pollux, F.

ULSTER. CONNAUGHT.

Down (near Belfast, '85 H.).—Galway (Wr.).

Rare, but possibly overlooked. The records, Armagh ('88 J. 2),
and Santry ('94 Ht. 3), are to be referred to the preceding species.

H. polygoni, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Fermanagh, Mayo, Louth,
Limerick, Cork, Kerry.

Local—commoner in the west, where it occurs on The Blaskets,
Achill, and Killybegs.

H. variabilis, Herbst.

ULSTER. LEINSTER. MUNSTER.

Common. Not recorded from Connaught.

H. murina, F.

LEINSTER.

Dublin (Portmarnock, '54 Hn.).—Ireland (H. coll.).

The records, Louth ('92 C. 5), and Glencullen ('92 Bn. & C.), are
to be deleted.

H. plantaginis, De G.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster. Galway, Louth, Dublin, Clare, Waterford, Cork, Kerry.

Fairly common, more frequent on the coast than inland.

[*H. meles*, F. The record, Sutton ('93 Ht. 3), is to be deleted.]

H. trilineata, Marsh.

ULSTER. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Louth, Dublin, Wexford, Waterford, Cork.

Frequent.

H. nigrirostris, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. The var. *ononidis*, Stev., occurs.

Cleonus sulcirostris, L.

ULSTER.

Down (Newcastle, '57 H.; "plentiful on Dundrum and Newcastle sandhills," Fg. MS.).

There is a specimen in Mr. Furlong's collection, now in the Dublin Museum, labelled "Tyrella Sands, Dundrum, rather plentiful."

Liosoma ovatum, Clairv.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common. The var. *collaris*, Rye, has been recorded from Dublin (Woodlands, '91 F. 1; '95 Ht. 3), and Cork (Queenstown, in moss, '95 Wr.).

L. oblongulum, Boh.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Colin Glen, Ht. coll. Wl.).—Armagh (Loughgilly, J.).—Galway (Wr.).—Dublin (Portmarnock and Lucan, Ht.).—Kilkenny (Woodstock, Ht.).—Kerry (Kenmare, '98 Ht. 4).

Local.

L. troglodytes, Rye.

CONNAUGHT.

Galway (Clonbrock, coll. D.).

One specimen taken in this locality by the Hon. R. E. Dillon,

identification verified by Mr. G. C. Champion. This species has been recorded from the Pyrenees, France, and a few localities in the south-east of England. The record, Armagh ('92 J. 1), is to be referred to *L. oblongulum*.

***Liparus coronatus*, Goeze.**

LEINSTER.

Dublin (Portmarnock, '54 Hn.).

Very rare. There are two examples in the Haliday collection, marked as Irish, which are probably from this locality.

***Hylobius abietis*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in Ulster. Also in the counties of Sligo, Galway, Louth, King's County, Wexford, Waterford, Cork, Kerry.

Locally common about fir plantations. It has been recorded as causing injury to Scotch fir ('90 Cr.), spruce ('92 Cr. 3), Douglas pine ('94 Cr.), and larch ('95 Cr. 1), in various parts of Ireland.

***Orchestes quercus*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Coxtown, '95 J. 1).—Down (Cultra, '92 Pt. & Dn.).—Roscommon (Mote Park, Ht.).—Dublin (local '54 Hn.).—Clare and Limerick (Shannon dist., Ht.).—Waterford ('78 P.).—Cork (Queenstown, '95 Wr.).

***O. scutellaris*, Gyll.**

ULSTER.

Derry (Culmore, on alder, '00 B.).—Antrim (Cullybacky, J.).—Down (near Belfast, '85 H.).

***O. alni*, L.**

CONNAUGHT. LEINSTER. MUNSTER.

Galway (Wr.).—Dublin ('54 Hn.).—Clare (Cratloe, Nl.).—Waterford ('78 P.; Tramore, J.).

The variety *ferrugineus*, Marsh, has been recorded from "near Belfast" ('85 H.), and Queenstown ('95 Wr.).

***O. ilicis*, F.**

CONNAUGHT. LEINSTER. MUNSTER.

Roscommon (Mote Park, '98 Ht. 1).—Galway (Clonbrock, '96 Ht. 2).—Dublin (Lucan, '94 Ht. 3).—Clare (Glenomeragh, Ht.).—Waterford (Lismore, '95 Ht. 1).—Cork (Glandore, Ht.).

On oak—local.

***O. fagi*.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***O. rusci*, Herbst.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Armagh, Roscommon, Galway, Westmeath, Dublin, Wexford, Clare, Limerick.

Local on birch and willow.

***O. stigma*, Germ.**

LEINSTER.

Dublin ('54 Hn.).—Kildare (Maynooth, '94 C. & Cr.).—Ireland (H. coll.).

***O. salicis*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Galway, Westmeath, Dublin, Wexford, Cork.

Locally common on willows.

***O. saliceti*, Payk.**

ULSTER. LEINSTER.

Donegal (Buncrana, on young willows, '95 Wr.).—Dublin (Glasnevin, '54 Hn.).—Kilkenny (Thomastown, Ht.).

Very local.

***Rhamphus flavicornis*, Clairv.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Galway, Westmeath, Dublin, Wexford, Clare, Limerick, Waterford, Cork, Kerry.

***Orthochæstes setiger*, Beck.**

ULSTER. LEINSTER. MUNSTER.

Armagh ('94 J. 1).—Dublin (Portmarnock, '54 Hn.; North Bull and Tallaght, Ht.).—Wicklow (Bray Head, '94 Ht. 1).—Waterford (Tramore, Ht.).

Grypidius equiseti, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common in marshy places on *Equisetum*.**Erirrhinus scirpi, F.**

ULSTER.

Fermanagh (Belleisle, '98 Pr.).—Cavan (Lough Oughter, '94 J. Ht. Cr.).

Very local on lake shores. The records, Coolmore ('94 J. Ht. Cr.), Holywood ('92 J. 5; 92 Pt. & Dn.), and Armagh ('92 J. 4), are to be referred to *E. acridulus*, L.**E. bimaculatus, F.**

LEINSTER.

Wexford (Slaney bank near Wexford, Ht.).

Taken by sweeping herbage close to high-water mark, July, 1899. There are Irish specimens in the Haliday collection.

E. acridulus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

E. æthiops, F.

ULSTER. CONNAUGHT.

Down (Gorraghswood, Sp.).—Armagh ('88 J. 2; Maghery, Lough Neagh, '89 J. 1).—Fermanagh (Tempo, '97 L. 1; Belleisle, '98 Pr.).—Roscommon (Mote Park, '98 Ht. 1).—Galway (Clonbrock, '96 Ht. 2).

Very local. Mr. Johnson obtained large numbers at Armagh, on three occasions—once on *Sparganium* in September, in a mass of moss in May, and in flood-refuse also in May. On other occasions it has generally occurred singly. It is always found in marshy places where *Sparganium* and *Equisetum* grow, and it is possible that the larva may feed on either of these plants. The species is of northern range in Great Britain, occurring in various Scotch localities, and as far south as Yorkshire. Elsewhere it is found in northern Europe, Siberia, and in North America. A variety (var. *lapponicus*) has been described from Lapland.**Thryogenes festucae, Herbst.**

ULSTER.

Antrim. (Plentiful on the banks of the Lagan Canal near Belfast, coll. B.).—Ireland (H. coll.).

T. Nereis, Payk.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Down (Belfast, 91 F. 1).—Kilkenny (Thomastown, Ht.).—Wexford (Enniscorthy, Killurin, &c., Ht.).—Clare and Limerick (lake shores, Ht.).—Waterford (Lismore and Cappoquin, Ht.).—Kerry (Rossbehy, '71 S.).

Locally common.

[*T. scirrhosus*, Gyll. Dublin (dist., '78 M.). M'Nab includes this species in the Dublin list evidently on the strength of the "*Eirrhinus schirrhosus*, Schön" recorded by Hogan ('54 Hn.), very possibly the preceding species was intended in the latter reference.]

Dorytomus tortrix, L.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Carrickfergus, '00 J. 4).—Down (near Belfast, '85 H.; Holywood, '00 J. 3; Strandtown, '00 J. 4).—Dublin ('54 Hn.).—Kildare (Maynooth, Cr.).—Cork (Queens-town, under poplar-bark, '95 Wr.).—Kerry (Kenmare, '98 Ht. 4).

Local.

D. hirtipennis, Bedel.

ULSTER.

Donegal (Buncrana, '95 Wr.).

One example taken on young willows.

D. maculatus, Marsh.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Down, Armagh, Fermanagh, Roscommon, Galway, Dublin, Wexford, Cork, Kerry.

Common on willows in spring. The var. *Silbermanni*, Wenck., occurs in the Foyle district.

D. pectoralis, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Buncrana, '95 Wr.).—Down (near Belfast, '85 H.).—Galway (Clonbrock, '96 Ht. 2).—Dublin ('54 Hn.).—Wexford (Killurin, Ht.).—Kerry (Kenmare, '98 Ht. 4).

Tanysphyrus lemnae, F.

ULSTER. LEINSTER.

Antrim (Lagan Canal, B.).—Armagh ('90 J. 1).—Westmeath (drains near Lough Ennell, Ht.).—Dublin (Rathfarnham, '54 Hn.).—Wexford (marl-holes in the extreme south-east, Ht.).

Bagous alismatis, Marsh.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Lagan Canal, B.).—Armagh ('96 J. 1).—Mayo (Ballina, '71 S.).—Roscommon (Mote Park, '98 Ht. 1).—Dublin ('54 Hn.; Royal Canal, '94 Ht. 3; Santry, '95 Ht. 3).—Kilkenny (Thomastown, Ht.).—Wexford (Enniscorthy, Ht.).

Frequent on water plants.

[*B. lutosus*, Gyll. The record, Lowry's Lough ('92 J. 2), is to be deleted.]

B. claudicans, Herbst. (*B. frit*, Brit. Col.).

ULSTER.

Armagh ('98 Ch., coll. J.).

[*B. lutosus*, Gyll. The record, Armagh ('92 J. 4), is to be deleted.]

B. glabrirostris, Herbst. (*lutulentus*, Gyll.).

ULSTER. MUNSTER.

Armagh ('92 J. 4; '98 Ch.).—Clare (Killaloe, '71 S.).

The var. *nigritarsis*, Thoms., has been taken at Armagh ('98 Ch., coll. J.).

Anoplus plantaris, Naevs.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Armagh, Galway, Westmeath, King's County, Wexford, Clare, Limerick, Kerry.

Common on birch.

A. roboris, Suffr.

ULSTER. LEINSTER.

Derry (Foyle dist., '00 B.).—Kilkenny (Thomastown, on the bank of the Nore, Ht.).

Very local, on boggy ground.

***Elleschus bipunctatus*, L.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Roscommon (Mote Park, '98 Ht. 1).—Galway (Clonbrock, D.).—Westmeath (Derravaragh, Ht.).—Dublin ('54 Hn.).

[*E. scanicus*, Payk. Portmarnock ('54 Hn.)—the specimen from which this record was made is in the Haliday collection, and proves to be immature *E. bipunctatus*, L.]

***Tychius tomentosus*, Herbst.**

MUNSTER.

Kerry (Ballybunion, '98 C.).

Under stones at the mouth of the Cashen river.

***Miccotrogus picirostris*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Antrim, Down, Armagh, Galway, Louth, Dublin, Kilkenny, Wexford, Waterford, Kerry.

Locally common.

***Miarus campanulæ*, L.**

CONNAUGHT. LEINSTER. MUNSTER.

Galway (Lough Derg, Ht.).—Clare (Ballyvaughan, '95 Ht. 6).—Longford (Priest's Island, Lough Ree, '00 Ht. 1).

Very local on flowers of *Campanula*.

***Gymnetron villosulus*, Gyll.**

ULSTER.

Armagh (Lowry's Lough, '89 J. 1).

***G. beccabungæ*, L.**

ULSTER. LEINSTER. MUNSTER.

Armagh (J.).—Fermanagh (Belleisle, '98 Pr.).—Westmeath (Derravaragh, Ht.).—Clare (Killaloe, '71 S.).—Limerick (Lough Gur, Ht.).—Cork (Glen of the Shournagh River, '55 H. 1).

The Irish examples are to be referred to the var. *veronicae*, Germ.

G. pascuorum, Gyll.**MUNSTER.**

Kerry (Ballybunion, under stones at the mouth of the Cashen river, '98 C.; Kenmare, '98 Ht. 4).—Ireland (H. coll.).

G. labilis, Herbst.**ULSTER. CONNAUGHT. LEINSTER. MUNSTER.**

Antrim (Belfast dist., B.).—Armagh ('92 J. 4).—Fermanagh (Belleisle, '98 Pr.).—Roscommon (Mote Park, '98 Ht. 1).—Galway (H. MS.; Woodford, Ht.).—Dublin (Portmarnock, '94 Ht. 3).—Cork (Glandore, Ht.).—Kerry (Derrycunihy Wood, Cs.).

G. antirrhini, Payk.**LEINSTER.**

Dublin (not common, '54 Hn.).

There is an Irish specimen in the Haliday collection.

Mecinus pyraeter, Herbst.**ULSTER. CONNAUGHT. LEINSTER. MUNSTER.**

Common.

M. collaris, Germ.**LEINSTER.**

Wexford (Slaney bank, near Wexford, Ht.).

Taken by sweeping herbage close to high-water mark.

Anthonomus ulmi, De G.**ULSTER. LEINSTER. MUNSTER.**

Down (near Belfast, '85 H.).—Armagh ('92 J. 4).—Dublin (Glasnevin Gardens, '54 Hn.; Portmarnock, '94 Ht. 3).—Wexford (Ross-lare, Ht.).—Kerry (Kenmare, Ht.).

A. Rosinæ, Des Gozis.**ULSTER.**

Antrim (Ballycastle, Cs.; Belfast, coll. B.).

On hawthorn.

A. pedicularius, L.**ULSTER. CONNAUGHT. LEINSTER. MUNSTER.**

Common on flowers of whitethorn.

[*A. Chevrolati*, Desbr. The record, Armagh ('88 J. 5), is to be deleted.]

***A. pomorum*, L.**

ULSTER. LEINSTER.

Down (near Belfast, '85 H.).—Armagh (J.).—Dublin ('54 Hn.).

***A. rubi*, Herbst.**

ULSTER. LEINSTER. MUNSTER.

Donegal, Derry, Armagh, Meath, Westmeath, Dublin, Wexford, Waterford.

***A. comari*, Crotch.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Armagh, Galway, Louth, Limerick, Waterford, Cork, Kerry.

Common.

***Nanophyes lythri*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common on *Lythrus*.

***Cionus scrophulariæ*, L.**

ULSTER. MUNSTER.

Down (near Belfast, '85 H.).—Kerry (Dingle, '55 Hn. 2).
The specimens cannot be traced.

[*C. thapsus*, F. The record, Loughgilly ('93 Jn.), is to be referred to the following species.]

***C. hortulanus*, Marsh.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Milford, coll. Osb.).—Armagh (Loughgilly, Jn.; Poyntzpass, larva and pupa, '99 J.).—Roscommon (Mote Park, '98 Ht. 1).—Dublin ('54 Hn.).—Kildare (Maynooth, '94 C. & Cr.).—Queen's County ('01 Bn.).—Wexford (Courtown and Killurin, Ht.).—Waterford (Lismore, Ht.).—Cork (Skibbereen, Sp.).—Kerry (Dingle, Ht.).

Locally common on *Scrophularia*.

***C. blattariæ*, F.**

There is an example of this species in Mr. Haliday's collection, marked as having been taken in Ireland.

C. pulchellus, Herbst.

MUNSTER.

Kerry (Kenmare, '98 Ht. 4, coll. Hr.).—Ireland (H. coll.).

Orobitis cyaneus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Ardara, J.).—Antrim (Portrush, '90 J. 1).—Down (near Belfast, '85 H.; Rostrevor, Fg. MS.).—Armagh (Vicars Cairn, '88 J. 5; Lowry's Lough, '88 J. 2; Poyntzpass, J.).—Sligo (Enniscrone, J.).—Galway ('91 F. 1, coll. Wr.).—Louth (Carlingford Mt., '88 J. 1).—Dublin (Portmarnock, '00 Ht. 3).—Kilkenny (Thomastown, Ht.).—Wexford (Ht.).—Waterford (Lismore, Cappoquin, and Tramore, Ht.).—Kerry (Rossbehy, Fg. MS.; Kenmare, '98 Ht. 4).

Not common—usually in moss on high ground, but the Portrush, Portmarnock, and Enniscrone examples were taken in moss from the sandhills.

Cryptorrhynchus lapathi, L.

ULSTER. LEINSTER.

Armagh (Coney Island, Lough Neagh, '95 J. 4).—Wicklow (Boulnalea, Fg. MS.; Murragh, C.).—Wexford ("on the B. Boura," Fg. MS.).

Taken on one occasion in some numbers on bark of willows. The insects bore a remarkable resemblance, as they sat on the tree, to droppings of birds, and might very easily have been passed by.

Acalles roboris, Curt.

MUNSTER.

Kerry (Rossbehy, '71 S.).

A. ptinoides, Marsh.

ULSTER. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.).—Louth (Carlingford, J.).—Dublin (Dundrum, '00 Ht. 3).—Wicklow (Bray Head, '95 Ht. 3).—Wexford (Forth Hills, Ht.).—Cork (Glandore, Ht.).

A. turbatus, Boh.

ULSTER. LEINSTER.

Donegal (Foyle dist., '00 B.).—Antrim (Ballycastle, T.).—Dublin (Dundrum, '00 Ht. 3).

***Mononychus pseudacori*, F.**

There are Irish specimens of this species in the Haliday collection.

***Cœliodes rubicundus*, Herbst.**

ULSTER. CONNAUGHT. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Armagh (Churchill &c., '92 J. 4).—Roscommon (Mote Park, Ht.).—Galway (Clonbrock, '96 Ht. 2; Woodford, Ht.).—King's County (Seagull Bog, '95 Ht. 5).

On birch—locally abundant.

***C. quercus*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Ballycastle, Cs.).—Galway (Recess, '95 Ht. 6).—Louth (Cartown, C.).—Dublin ('54 Hn.).—Wexford (Courtown, C.; Killoughrum, Ht.).—Clare (Cratloe Wood, Ht.).

[*C. ruber*, Marsh. The record, Courtown ('92 C. 5), should refer to the preceding species.]

***C. erythroleucus*, Gmel.**

There is an Irish example in the Dublin Museum formerly in the collection of Trinity College.

***C. cardui*, Herbst.**

ULSTER. CONNAUGHT.

Down (Bangor, '95 Wr.).—Galway (Wr.).

"Rarely, by sweeping."

***C. quadrimaculatus*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***Poophagus sisymbrii*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Ardara, '93 J. 1).—Antrim (Lagan Canal, B.).—Armagh ('92 J. 4).—Roscommon (Mote Park, Ht.).—Galway ('91 F. 1; Clonbrock, '96 Ht. 2).—Westmeath (Lough Ennell, Ht.).—Dublin (Santry, '95 Ht. 3).—Wexford (Rosslare, Ht.).—Waterford ('91 F. 1).—Cork (Glandore, Ht.; Queenstown, Wr.).—Kerry (Killarney, '71 S.).

Common.

***Ceuthorrhynchus assimilis*, Payk.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***C. constrictus*, Marsh.**

MUNSTER.

Waterford ('78 P.).

***C. cochlearis*, Gyll.**

ULSTER. LEINSTER. MUNSTER.

Armagh ('92 J. 4).—Wexford (Enniscorthy, Ht.).—Kerry (Killarney, 47 W. 1).

***C. erice*, Gyll.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common on heather.

***C. erysimi*, F.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim, Down, Armagh, Cavan, Galway, Louth, Westmeath, Dublin, Wicklow, Waterford, Cork.

Common, the variety *chloropterus*, Steph., occurs.***C. contractus*, Marsh.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***C. hirtulus*, Germ.**

ULSTER.

Donegal (Buncrana sandhills, '00 B.).

***C. quadridens*, Panz.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal (Foyle dist., '00 B.; Buncrana, '95 Wr.).—Derry (Foyle dist., '00 B.).—Antrim (Glenshesk, Cs.).—Down (near Belfast, '85 H.; Bangor, '95 Wr.; Scrabo Hill, J.).—Galway (Clonbrock and Woodford, Ht.).—Dublin (on furze, Ht.).—Waterford ('78 P.).—Cork (Monkstown, coll. Ws.).

***C. pollinarius*, Forst.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. viduatus, Gyll.

ULSTER.

Derry (Foyle dist., '00 B.; Milford, coll. Osb.).—Armagh ('88 J. 2).

C. angulosus, Boh.

ULSTER. MUNSTER.

Derry (Culmore, '00 B.).—Antrim (Templepatrick, in June, B.).—Down (Bangor, '95 Wr.).—Waterford (Lismore, '95 Ht. 1),

Rare—at Bangor Mr. Walker took "three by sweeping under trees bordering a marshy place" only one example occurred in each of the other localities, by sweeping herbage.

C. pleurostigma, Marsh.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Mayo (Achill), Galway, Westmeath, Dublin, Carlow, Waterford, Cork, Kerry.

Common.

C. punctiger, Gyll.

ULSTER. CONNAUGHT. LEINSTER.

Armagh ('92 J. 4).—Galway (Roundstone, Ht.).—Dublin ('95 Ht. 3).

C. marginatus, Payk.

LEINSTER. MUNSTER.

Dublin (dist., '95 Ht. 3).—Waterford ('91 F. 1).

C. rugulosus, Herbst.

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Antrim (Portballintrae, '94 T.; Ballycastle, Cs.).—Down (Bangor, '95 Wr.).—Wexford (Ardcavan, Ht.).—Clare (Corrofin, Ht., coll. Gr.).—Waterford (Tramore, Ht.).

Local.

C. litura, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Down, Roscommon, Galway, Louth, Dublin, Kildare, Wicklow, Kilkenny, Clare, Limerick, Waterford, Cork.

Common where it occurs, on thistles.

Ceuthorrhynchidius floralis, Payk.

ULSTER. LEINSTER. MUNSTER.

Armagh ('92 J. 2).—Westmeath (near Lough Ennell, Ht.).—Dublin (Dodder Bank, near Terenure, '94 Ht. 3).—Kilkenny (Ht.).—Wexford (Ht.).—Clare (Finlough, Ht.).—Waterford (Tramore, Ht.).
Common.

C. terminatus, Herbst.

CONNAUGHT. MUNSTER.

Mayo (Ballina, '71 S.).—Waterford (cliffs near Tramore, Ht.).

[*C. quercicola*, Payk. The record, Cartown ('92 C. 5), is to be deleted.]

C. mixtus, Muls.

LEINSTER.

Meath (Laytown, '00 Ht. 3).

A single specimen taken on the Laytown sandhills, by sweeping plants. This would seem to be a rare species generally—Reitter mentions it from Germany, southern France, and the Caucasus; while in Great Britain it has only been recorded from Devon and Lincolnshire. It may possibly be overlooked in other localities.

C. troglodytes, F.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

C. Dawsoni, Bris.

LEINSTER. MUNSTER.

Dublin (Portmarnock, '00 Ht. 3).—Wexford (shore of the Slaney estuary near Wexford, Ht.).—Waterford (Tramore, Ht.).—Kerry (Kenmare, Cs.).

At the roots of plants, as a rule close to high-water mark. It has been recorded from various localities in the south of England, Scotland (Solway district), and France.

Amalus hæmorrhous, Herbst.

LEINSTER.

Dublin (Rare, '54 Hn.).

Balaninus brunneus of this reference—the specimens cannot be traced. The record, Armagh ('91 F. 1), is to be deleted.

Rhinoncus pericarpus, L.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

R. perpendicularis, Reich.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Armagh, Galway, Louth, Kilkenny, Wexford, Cork.

Common.

R. castor, F.

ULSTER. LEINSTER.

Derry (Foyle dist., '00 B.).—Down (near Belfast, '85 H.; Rostrevor, Fg. Ms.).—Louth (Cartown, '92 C. 5).—Dublin ('54 Hn.).—Kildare (Maynooth, '94 C. & Cr.).—Wexford (Rosslare sandhills, Ht.).

Very local.

Eubrychius velatus, Beck.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Down (Holywood, '55 H. 1).—Armagh ('92 J. 4).—Roscommon (Mote Park, &c., '98 Ht. 1).—Westmeath (Mullingar, Ht.).—Dublin (Santry, '94 Ht. 3; Grand Canal near Dublin, '00 Ht. 3).—Kildare (Monasterevan, '00 Ht. 3).—King's County (Clonmacnoise, '00 Ht. 1).—Carlow (Borris, '95 Ht. 8).—Wexford (Enniscorthy, Ht.).—Cork (Blarney Lake, '55 H. 1).—Kerry (Killarney, '47 W. 1).

Local on *Alisma*, *Equisetum*, and other water plants.

Litodactylus leucogaster, Marsh.

ULSTER. LEINSTER.

Antrim (Lagan Canal, B.).—Down (Holywood, '55 H. 1; Bangor, '95 Wr.).—Armagh ('92 J. 4; Portadown, '88 J. 2).—Dublin ('54 Hn.; Portmarnock, Ht.).—King's County (Clonmacnoise, '00 Ht. 1).

Local—on water plants.

Phytobius comari, Herbst.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Derry (Foyle dist., '00 B.).—Down (Holywood, '55 H. 1).—Armagh (Coney Island Lough Neagh, '92 J. 1).—Sligo (Lough Gill, J.).—Dublin (Rush, '92 Sp.).—King's County (Clonmacnoise, '00 Ht. 1).—Clare (Broadford, Ht.).

***P. quadrituberculatus*, F.**

ULSTER. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B., Buncrana, '95 Wr.).—Antrim and Down (Belfast dist., '85 H.; B.; Bangor, '95 Wr.; Holywood, '55 H. 1).—Armagh ('92 J. 4).—Dublin ('54 Hn.; Rush, Sp.; North Bull, Ht.).—Waterford ('78 P.).—Cork (Middleton, '95 Wr.).

***P. canaliculatus*, Fahr.**

ULSTER. CONNAUGHT.

Donegal (Coolmore, '95 J. 1).—Armagh (Lowry's Lough, '92 J. 1).—Cork (Blarney Lake, '55 H. 1).—Kerry (Killarney, '47 W. 1).

***P. quadricornis*, Gyll.**

LEINSTER.

Dublin (Local, '54 Hn.).

The specimens cannot be traced.

***Limnobaris T-album*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim, Down, Armagh, Mayo, Galway, Westmeath, King's County, Wexford, Clare, Limerick, Waterford, Cork, Kerry.

Locally common on reeds, *Carex*, &c., in marshy places.

***Balaninus betulæ*, Steph.**

MUNSTER.

Kerry (Caragh Lake, coll. Yr.).

Taken by Col. J. W. Yerbury, August, 1901.

***B. salicivorus*, Payk.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Common.

***B. pyrrhoceras*, Marsh.**

ULSTER. CONNAUGHT. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Armagh ('92 J. 4).—Galway (Clonbrock, Ht.).—Limerick (Ht.).—Cork (Queenstown, '95 Wr.).

***Magdalis armigera*, Fourc.**

LEINSTER. MUNSTER.

Dublin (Santry, on elms, '94 Ht. 3).—Waterford (Dromana Forest near Cappoquin, Ht.).

***M. pruni*, L.**

Ireland (H. coll.).

[*M. carbonaria*, L. The record, Santry ('93 Ht. 3), is to be deleted.]

***Calandra granaria*, L.**

LEINSTER.

Dublin (Corn stores, '54 Hn.).—Down (near Belfast, '85 H.).

For an interesting account of the injury caused to stored grain by this, and the following species see ('55 Hg.).

***C. oryzae*, L.**

LEINSTER.

Dublin (Corn stores, '54 Hn.; "Customhouse wall" H. MS.).

***Rhopalomesites Tardyi*, Curt.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal, Derry, Antrim, Down, Fermanagh, Mayo, Galway, Louth, Westmeath, Dublin, Wicklow, Wexford, Cork, Kerry.

Locally abundant in wooded districts throughout Ireland. It occurs in colonies, boring in the wood of holly, beech, willow, poplar, alder, and mountain ash, but more especially in the two first mentioned trees. As a rule the beetles confine their attacks to old or unhealthy trees, especially where the bark has been injured, the exposed surface of the wood being sometimes riddled by their borings. This interesting weevil is extremely local in the south-west of England, and the Clyde and Argyle districts of Scotland. Germany is the only continental locality mentioned by Reitter. The larva and pupa are figured and described in ('01 Cr.).

***Caulotrypis æneopiceus*, Boh.**

LEINSTER. MUNSTER.

Dublin (Portmarnock, common in an old ash tree, '00 Ht. 3; coll. B.).—Cork (Found in profusion near Cork, '52 St.).

***Codiosoma spadix*, Herbst.**

LEINSTER.

Dublin (South Bull, '00 Ht. 3).

In a piece of drift-wood.

SCOLYTIDÆ.

Hylastes ater, Payk.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.; Rathmullan, Wr.).—Down (near Belfast, '85 H.).—Armagh ('92 J. 4).—Galway (Tuam, '95 Cr. 1).—Dublin (Rathfarnham, '54 Hn.).—Waterford (Cappoquin, Ht.).—Cork (Middleton, under firs, '95 Wr.).—Kerry (Torc, Fg. MS.).

In fir plantations in which it has caused considerable injury to larch and Scotch fir.

H. opacus, Er.

LEINSTER.

Louth (south, '92 C. 5).

We have not seen any Irish examples.

H. palliatus, Gyll.

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Donegal and Derry (Foyle dist., '00 B.).—Galway (Tuam, '96 Cr.).—King's County (Clonad Wood, '95 Ht. 5).—Kerry (Torc, Fg. MS.).

Local—it has been recorded as injurious to spruce and Scotch fir in the county of Galway ('96 Cr.).

Hylastinus obscurus, Marsh.

ULSTER. LEINSTER.

Donegal and Derry (Foyle dist., '00 B.).—Armagh (Poyntzpass, J.).—Dublin (Ht.).—Kildare (Maynooth, Fg. MS.).—Wexford (Killoughrum Forest, Ht.).

Hylesinus fraxini, Panz.

LEINSTER. MUNSTER.

Dublin (Lucan Demesne, '93 Ht. 3; Dundrum, '94 Cr.).—Cork (Glanmire, Ht.).

Probably more widespread than these records indicate.

H. vittatus, Fab.

Ireland (H. coll.).

***Myelophilus piniperda*, L.**

ULSTER. CONNAUGHT. LEINSTER. MUNSTER.

Antrim (Cranmore, '91 F. 1).—Down (near Belfast, '85 H.).—**Armagh** ('91 F. 1; Poyntzpass, J.).—Galway (Tuam, '94 Cr.; **Woodford**, Ht.).—King's County (Tullamore, '01 Cr.).—Tipperary (**Allmann**).—Cork (Ht.).—Kerry (Torc, Fg. MS.).

Under bark of fir trees.

***Phloeophthorus rhododactylus*, Marsh.**

LEINSTER. MUNSTER.

Wicklow (Bray, on furze, '94 Ht. 1).—Wexford (Fg. MS.).—Cork (Queenstown, '95 Wr.).—Ireland (H. coll.).

***Pityophthorus pubescens*, Marsh.**

CONNAUGHT. LEINSTER. MUNSTER.

Galway (Woodford, Ht.).—Wicklow (Bray, '54 Hn.).—Wexford (under fir trees, Ht.).—Clare (south, Ht.).—Cork (Queenstown, '95 Wr.).

In fir woods.

***Dryocætes villosus*, F.**

ULSTER.

Derry (Walworth Wood, July, coll. B.).

Two examples found in a branch of oak, by Mr. C. W. Buckle.

***Pityogenes bidentatus*, Herbst.**

ULSTER.

Armagh ('92 J. 4).

A single specimen in Mr. Johnson's garden.

***Trypodendron domesticum*, L.**

ULSTER. CONNAUGHT.

Donegal (Foyle dist., in a fallen beech tree, '00 B.).—Mayo (Westport, '91 F. 1).—Roscommon (Cloonca Wood, '98 Ht. 1).

ABNORMAL COLEOPTERA.**STYLOPIDÆ.*****Elenchus tenuicornis*, Kirby.****ULSTER.**

Down (Holywood, H. MS. ; "End of June, 1830, and July, 1831, Mr. Haliday took two females in sweeping some herbage near Belfast" '39 Curtis). "Belfast (Templeton); the latter specimen is now in the University Museum, Oxford" ('91 F. 1).

This interesting species has not been found in Ireland since Haliday's time, his Belfast specimens, both of the perfect insect and larva, are preserved in the Dublin Museum collection.

SUPPLEMENTARY LIST.

(ADDED IN PRESS.)

[*Species distinguished by an asterisk are additions to the foregoing list.*]

***Carabus clathratus*, L.**—Holywood Warren (H. MS.).

***Pelophila borealis*, Payk.**—On the edge of Lough Shark, near Poyntzpass, Co. Down (J.).

***Blethisa multipunctata*, L.**—Lagan Canal bank, near Moira (B.).

***Badister sodalis*, Duft.**—Not uncommon at Kinbane, Co. Antrim, on the chalk (T.).

***Harpalus puncticollis*, Payk.**—Ballycastle, Co. Antrim (T.).

***Pterostichus anthracinus*, Ill.**—Shore of Lough Neagh, at Shane's Castle (B.).

***Calathus nubigena*, Hal.**—Ballycastle (T.).

****Anchomenus Thoreyi*, Dej.**—In flood refuse from Armagh (Sp.).

***Bembidium assimile*, Gyll.**—Holywood Warren (H. MS.).

***B. argenteolum*, Ahr.**—Glenavy, Lough Neagh (coll. Orr).

Patrobus excavatus, Payk.—The Horn Head and Rostrevor records of this species ('85 Pn.) are to be deleted.

**Hydroporus granularis*, L. } In the Lagan Canal, near Moira
**H. dorsalis*, F. } (coll. B.).

H. angustatus, Sturm. } Strandtown (J.).
H. memnonius, Nic. }

Acilius sulcatus, L., var. *scoticus*, Curt.—Ballycastle (T.).

Philydrus testaceus, F.—Near Belfast (B.).

Limnebius nitidus, Marsh.—Ballycastle (T.).

Helophorus Mulsanti, Rye.—Strangford Lough (coll. B.).

**Hydrochus brevis*, Herbst.—Near Belfast (B.).

Cercyon hæmorrhous, Gyll.—Near Moira (B.).

**C. minutus*, Muls.—Shane's Castle, near Antrim (B.).

Aleochara grisea, Kr.—Ballycastle (T.).

**Oxypoda lentula*, Er. } Near Belfast (coll. B.).
Ocalea castanea, Er. }

Calodera æthiops, Grav.—In moss near Shane's Castle (coll. B.).

**Homalota cuspidata*, Er.—Grand Canal bank, near Lucan, under bark of felled elms. At the time of capture (May) the beetles were rather scarce, but the larvæ were extremely abundant under the bark where there was sufficient moisture (Ht.).

**H. æneicollis*, Sharp. } In fungi, Priest Island, in Lough Ree
H. trinotata, Kr. } (Sh., coll. Ht.).

H. palustris, Kies.—Belfast (Sh., coll. B.).

Xenusa uvida, Er.—Ballycastle (T.).

X. sulcata, Kies.—Shore near Youghal (Ht.).

Encephalus complicans, Westw.—Ballycastle (T.).

Gyrophæna gentilis, Er.—Foyle district (coll. B.).

Hydronoma dimidiata, Grav.—Near Belfast (B.).

Gymnusa brevicollis, Payk.—Near Moira (B.).

**Conosoma immaculatum*, Steph.—In moss at Shane's Castle (B.).

Tachinus humeralis, Grav. } Ballycastle (T.).
Megacronus analis, F. }

Quedius puncticollis, Thoms.—Belfast Docks (B.).

Q. maurorufus, Grav.—Near Belfast (B.).

Philonthus carbonarius, Gyll.—Thomastown, Co. Kilkenny (Ht.).

P. longicornis, Steph.

P. discoideus, Grav.

Actobius cinerascens, Grav.

Leptacinus parumpunctatus, Gyll.

Evæsthetus ruficapillus, Lae.

} Near Belfast (B.)

- Stenus cicindeloides**, Grav.—Clonbrock, Co. Galway (coll. D.).
S. fornicatus, Steph.—Near Belfast (B.).
Blodius arenarius, Payk.—Strangford Lough (B.).
Trogophloeus rivularis, Mots.—Belfast (B.).
T. pusillus, Grav.—Belfast Docks (B.); Lucan (Ht.).
Omalium punctipenne, Thoms.—Lucan, under elm bark (Ht.).
Pselaphus Heisei, Herbst. } Ballycastle (T.).
Tychus niger, Payk. }
Neuraphes elongatulus, Müll. }
N. angulatus, Müll. } Cave Hill, Co. Antrim (coll. B.).
Eumicrus tarsatus, Müll. }
Eucornus hirticollis, Ill.—Near Belfast (coll. B.).
Agathidium varians, Beck.—This species is recorded from Belfast in the preceding list—the exact locality is Shane's Castle, Co. Antrim.
Silpha dispar, Herbst.—Toome, Lough Neagh (coll. Orr).
 [*Saprinus rugifrons*, Payk.—The record, Cushendun ('90 J. 2'), must be deleted.]
Corylophus cassidioides, Marsh.—Belfast (coll. B.).
Olibrus bicolor, F.—Monkstown and Glanmire, Co. Cork (Ht.).
Meligethes lumbaris, Sturm.—Near Belfast (B.).
Seronia grisea, L. }
Rhisophagus perforatus, Er. } Ballycastle (T.).
Atomaria nigriventris, Steph.—Cave Hill (coll. B.).
Geotrupes typhæus, L.—Near Monkstown, Co. Cork (Ht.).
 [*Anomala Frischii*, F.—The records "Co. Kerry, Co. Cork, and near Belfast," in the reference ('91 F. 1) need verification. Canon Fowler informs us that he has no recollection of the origin of these records.]
Lema septentrionis, Weise.—Glanmire, Monkstown, and Blarney, Co. Cork—frequent (Ht.).
Lamprosoma concolor, Sturm.—Glanmire (Ht.).
Lochmusa cratægi, Forst.—Monkstown, Co. Cork (Ht.).
Crepidodera rufipes, L.—Ram's Island, Lough Neagh (coll. Orr).
Psylliodes affinis, Payk.—Ballycastle (T.).
P. picina, Marsh.—Near Belfast (B.).
Nacerdes melanura, Schmidt.—Sand Quay, Belfast (B.).
 ***Apion Bohemani**, Thoms.—Common near Belfast (coll. B.).
Liosoma troglodytes, Rye.—Colin Glen, near Belfast (Ch., coll. B.).
Orchestes alni, L.—Monkstown, Co. Cork (Ht.).

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END OF VOLUME VI., SERIES III.

ERRATA.

- Page 31, 12th line from foot, *for* "1872" and "1878" *read* "1879" and "1898"
- .. 55, line 18, *for* "nairve" *read* "navire".
- .. 58, 5th line from foot, *for* "University" *read* "universal".
- .. 77, line 26, *read* "Dictionary of Universal Geography".
- .. 77, line 30, *for* "dermère" *read* "derrière".
- .. 83, note 1, *for* "Monarchs" *read* "Monarchies".
- .. 83, note 2, *for* "Lagard" *read* "Layard".
- .. 83, note 5, *for* "Sidon" *read* "Didron".

ADDENDA.

- Page 132 (No. 10), KILBRACK.—This is a late church, probably of the sixteenth or early seventeenth century. It measures externally $30\frac{1}{2}$ feet by $61\frac{1}{2}$ feet. The end walls are $4\frac{1}{2}$ feet thick, and a partition wall, with a recess probably for an altar, crosses the church 17 feet from the east end. There was a small window in the apex of each gable, now nearly destroyed, below which is a row of corbels and two ambreys in each case. There were three windows and a door in each side; only the western one of the south wall remains, a plain square-headed window with two lights plainly chamfered and a hood. The doors were pointed; one had a round moulding.
- „ 134 (No 21), GLENCOLUMBILLE.—The east window is chamfered and recessed, the light 6 inches wide, the head fallen. It belongs, like the gable and part of the south wall, to the twelfth century. The south window was closed when O'Brien's tomb was built; the south door is pointed and of the fifteenth century, the north and west walls are nearly down. The church measures externally $21\frac{1}{2}$ feet by 42 feet, and once extended farther westward; the walls are $2\frac{1}{2}$ feet thick. The church stands in a large rath. A small broken cross with plain octagonal shaft stands on a base with three steps near the road.
- „ 139 (No 45), KILTACHYMORE.—The church measures 15 feet by 30 feet internally, the walls being $2\frac{1}{2}$ feet thick. It is of large old masonry. The east window seems on the point of falling; it has a massive inner lintel and a chamfered sill.
- „ 144 (No. 65), KILQUANE.—There is a bullaun in the graveyard.
- „ 175, add to the the list of photographs. *Churches*—Croghane, Glencolumbille, Kilbrack, Kilchrist, Kiltachymore, Kiltinanlea, Kinallia.
- „ 423 (No 32), CAHERIDOUA stands on a steep and in parts perpendicular knoll of rock. The wall is double, of good coursed masonry; the sections respectively 7 feet 2 inches and 8 feet 6 inches. The gate was 3 feet 10 inches wide, with side slabs 4 feet 6 inches high, and two lintels 6 feet 2 inches and 5 feet 8 inches long. The fort is 92 feet in external diameter.
- „ 431 (No. 104) CAHERBLONICK.—An oval caher of good coursed masonry with upright joints. It measures externally 153 feet north and south, and 125 feet east and west. The wall is $12\frac{1}{2}$ feet thick, and the gateway to the east. A dolmen 24 feet long lies near it to the west, and a cairn 9 feet high and 79 feet in diameter to the north. Stone implements were found in the townland.
- „ 460 (No. 196), Caheraforia is in Ballinooskny.

MONDAY, APRIL 9, 1900.

PROFESSOR J. P. O'REILLY, C.E., in the Chair.

Rev. Henry Francis John Martin, M.A. (Dubl.), and Professor Stanley Lane Poole, M.A. (Oxon.), were elected Members of the Academy.

Mr. Francis J. Bigger read a Paper on "The Dextera Dei sculptured on the High Crosses of Ireland."

Mr. G. H. Kinahan, C.E., read a Paper on "Some of the Laccolithic Irish Hills."

Read the following letters :—

" MUSEUM D'HISTOIRE NATURELLE.

" PARIS, 21 *Mars* 1900.

" MONSIEUR LE SECRÉTAIRE,

" Je viens de recevoir la lettre par laquelle vous voulez bien m'apprendre que l'Académie Royale Irlandaise m'a fait le grand honneur de me nommer membre honoraire dans la section des sciences. Je suis touché de cette distinction qui m'est donnée par votre illustre Académie et m'unit à un pays très aimé par les Français. Je vous prie d'agréer pour vous et de faire agréer à tous les membres de l'Académie, particulièrement au Président, M. le Comte de Rosse, mes vifs remerciements.

" Veuillez, Monsieur et honoré confrère, agréer l'assurance de mes sentiments le plus distingués et dévoués.

" ALBERT GAUDRY,

" de l'Institut de France."

" 38, GEORGE SQUARE, EDINBURGH,

" *March* 21, 1900.

" REV. SIR,

" I have only now had your letter and the Diploma forwarded to me from the Society's Rooms. I pray that, under my present circumstances, you will kindly accept this very informal expression

of my obligations to the Royal Irish Academy for the very distinguished honour it has been good enough to confer on me. The Academy has always been associated, in my mind, with my great Master in Quaternions, Sir W. R. Hamilton, and this consideration makes me feel its kindness all the more.

"Yours truly,

"P. G. TAIT.

"The Rev. J. H. BERNARD, D.D."

"HOLM LEIGH, WEST ROAD, CAMBRIDGE,

"*March 18th*, 1900.

"DEAR SIR,

"I thank you most heartily for your congratulations on the great honour which your Society has paid me in making me one of its Honorary Members. I should also to thank the Council of the Society, and to assure its Members that I appreciate most highly the distinction they have conferred upon me.

"With very many thanks,

"Believe me, yours very sincerely,

"J. J. THOMSON.

"The Rev. J. H. BERNARD, D.D."

"CHARLOTTENBURG, *March 22nd*, 1900.

"SIR,

"I have the honour to thank you for your kind letter with the Certificate it announced, and beg you to express before the Royal Irish Academy my feelings of deep thankfulness for the extreme distinction it awarded in voting my Honorary Membership.

"Thanking you once more for your personal congratulations, I beg to remain with much respect,

"Yours very faithfully,

"J. H. VAN 'T HOFF."

MONDAY, APRIL 23, 1900.

MOST REV. DR. DONNELLY, Lord Bishop of Canea, Vice-President, in the Chair.

Rev. Henry F. J. Martin, M.A., signed the Roll, and was admitted a Member of the Academy.

Mr. Thomas J. Westropp, M.A., read a Paper on "The Cromlechs of Ballycroum, County Clare."

Two Querns from County Kerry, presented by the **Rev. George M'Cutchan**, were exhibited, and the thanks of the Academy voted to the donor.

Mr. John Ribton Garstin, D.L., Vice-President, reported that a notification having been received that the Queen would receive in person the Academy's Address of Welcome on the occasion of Her Majesty's visit to Ireland, and that the number of gentlemen presenting each Address would be limited to two, he had, with the Secretary, **Rev. Dr. Bernard**, attended at the Viceregal Lodge on the 18th of April and placed the Address in Her Majesty's hands.

[The Earl of Rosse, President of the Academy having to present, as Chancellor, the address from the University of Dublin, was precluded from presenting the Academy's Address.]

MONDAY, MAY 14, 1900.

DR. FRANCIS A. TARLETON, F.T.C.D., Vice-President, in the Chair.

Mr. T. G. H. Green, **Prof. Stanley Lane-Poole**, and **Mr. H. A. S. Upton** signed the Roll, and were admitted Members of the Academy.

Prof. Ambrose Birmingham, M.D., was elected a Member of the Academy.

Prof. J. P. O'Reilly, C.E., read a Paper on "The Milesian Colonisation from the point of view of Gold Mining."

Donations to the Library were announced, and thanks were voted to the Donors.

The following letter from the Secretary of the Royal Prussian Academy was read:—

“Der Royal Irish Akademie zu Dublin spricht die Akademie ihre tief und wahrhaft empfundene Dankbarkeit für den Antheil aus, welchen die königliche Akademie an ihrer Zweihundertjahrfeier freundlichst genommen und durch Entsendung von Vertretern sowie durch feierlich schriftlichen Ausdruck Ihrer Gesinnungen in einer der Akademie zu grosser Genugthuung und hoher Ehre reichenden Weise bethätigt hat.

“Die Adresse in welcher die königliche Akademie Ihre Werthschätzung der in den verflossenen beiden Jahrhunderten von der Akademie geleisteten Arbeit, Ihre collegialischen Sympathien in der Gegenwart, Ihre Segenswünsche für die Zukunft uns kundgegeben hat, verwahren wir als ein werthvolles Stück des kostbaren Schatzes, der das bleibende Denkmal unserer so erfreuend und wohlthuend verlaufenen Feier bildet. Gleichfalls zum bleibenden Gedächtniss derselben und Ihrer Theilnahme bitten wir die jetzt fertig gestellte und nächster Tage diesem Schreiben folgende Festbeschreibung freundlich annehmen und Ihrem Archiv einverleiben zu wollen. Seinen Werth erhält der schlichte Bericht, den wir aufgesetzt haben, durch die so vollständig als der Wortlaut noch festgestellt werden konnte eingefügten Ansprachen und durch die vollzählig im Anhang mitgetheilten Adressen.

“BERLIN, 30. April 1900.

“Königlich Preussische Akademie der Wissenschaften.

“A. ANWEES,

“z. Zt. vorsitzender Secretär.

“AN DIE ROYAL IRISH ACADEMY ZU DUBLIN.”

The Secretary of Council presented the following Recommendation of Council as to alteration of By-Laws, Chapter II., relative to the election of Members, and formally moved its adoption.

The Council recommend to the Academy the By-Laws proposed by the By-Laws Revision Committee in reference to the election of Members (Chapter II.).

CHAPTER II.

ELECTION AND ADMISSION OF MEMBERS.

1. *Ordinary Members.*

1. Ordinary Members are elected at the Stated General Meeting in the month of March in each year.

2. Every Candidate shall be proposed and recommended by a Certificate in writing signed by five or more Members, of whom three, at least, shall certify their recommendations from personal knowledge. The Certificate shall specify the name, rank, profession, qualifications, and usual place of residence of the Candidate, and when delivered to the Secretary shall be read out at the next ordinary Meeting and shall be hung up in a public room of the Academy. At the first ordinary Meeting of the Academy in February the names of all Candidates proposed subsequently to the Stated Meeting in March of the preceding year shall be read out by the Secretary from a list arranged in alphabetical order, and a copy of such list shall be sent to each Member with the Notice Paper for the Meeting next following. At the Council Meeting on the third Monday in February, the Council shall select by ballot from the printed list of Candidates a number not exceeding twelve to be recommended to the Academy for election. At such Meeting eleven Members must be present and voting; a majority deciding, or in the event of an equality the President or Chairman having a second or casting vote. At the Academy Meeting on the fourth Monday in February the President or Chairman shall read from the Chair the names of the Candidates whom the Council recommend, arranged in alphabetical order, and such select list shall be forwarded to each Member with the notice Paper for the Stated Meeting in March. At the Stated Meeting in March each Member present and voting shall deliver to the Chairman one of the select lists, having erased the name of any Candidate or Candidates for whom he does not vote, and if he shall have thought fit, having substituted the name of any other Candidate or Candidates contained in the original printed list.

Any Candidate who shall not have been elected shall, if any of his proposers so request in writing, continue a Candidate and his name shall be placed in alphabetical order with those of the new Candidates to be announced in February following, and his Certificate shall be hung up along with those of the new Candidates.

3. The Secretary of the Academy shall furnish to each Member, on his election, notice thereof, and shall inform him of the time of payment of his entrance fee, and of the annual subscription, according to such form as the Council shall direct.

4. Every Member, after his election, shall present himself for his admission into the Academy at some General Meeting thereof, prior to the Stated Meeting in November, or at the said Stated Meeting, or within such further time as shall, for some sufficient cause, be granted by the Council, otherwise his election shall be void. The admission of a Member into the Academy shall be in the manner and form following:—The President, taking him by the hand, shall say these words, or words to the same effect:—"In the name and by the authority of the Royal Irish Academy, I admit you a Member thereof."

5. And every Member, before his formal admission, shall, in the face of the Academy, subscribe this obligation:—

"We, whose names are underwritten, having been elected Members of the Royal Irish Academy, for advancing the study of Science, Polite Literature, and Antiquities, do hereby promise, each for himself, that we will endeavour to promote the good of said Academy, and to pursue the ends for which the same was founded; that we will be present at the meetings of said Academy as often as we conveniently can, especially at the annual elections, and upon extraordinary occasions; and that we will observe the Statutes and By-Laws for the time being of said Academy."

2. *Honorary Members.*

6. Honorary Members may be elected by the Academy on the special recommendation of the Council; the grounds of such recommendation to be stated in writing, and hung up in the public room of the Academy for one calendar month before the ballot for their election.

7. The election of Honorary Members shall take place at the Stated Meeting in March; and shall be by ballot, a simple majority being required for election.

8. There shall be two sections of Honorary Members, and the number in each shall be limited as follows:—Section of Science, thirty; of Polite Literature and Antiquities, thirty—total, sixty; and one-half at least of the Honorary Members in each section shall be foreigners. This limit of sixty does not include Members of the Royal Family or the President and Ex-Presidents of the Royal Society (see §§ 9 and 10.)

9. Members of the Royal Family may be elected to Honorary Membership without ballot.

10. The President and Ex-Presidents of the Royal Society of London shall be also Honorary Members of the Academy.

11. The Secretary shall send notice of election, and a diploma of Membership to each Honorary Member on his election.

12. Honorary Members are not required to contribute to the funds of the Academy; nor shall they have a vote at the Meetings of the Academy; nor be eligible as Officers, or Members of Council.

It was proposed by Mr. Edwin Hamilton, M.A., and seconded by Dr. Quinlan, that the consideration of the Report of the Council, with regard to changes in By-Laws be postponed till February next.

The motion was lost.

It was then proposed by Mr. J. Brennan, R.H.A., seconded by Mr. G. H. Kinahan, and resolved, that the debate be adjourned until the next meeting of the Academy, on May 28th.

MONDAY, MAY 28, 1900.

MR. JOHN RIBTON GARSTIN, D.L., F.R.S., Vice-President in the Chair.

Professor A. C. O'Sullivan, M.B., F.T.C.D., and Professor A. Birmingham, M.D., signed the Roll, and were admitted Members of the Academy.

The Secretary stated that, at the last meeting of the Academy, when the Scrutineers' return was handed in, a question arose in respect of the election of one of the Candidates for Membership, in whose case there was a large number of "neutral ballots." There being some doubt as to the construction of the 7th section of Chapter II. of the By-Laws, when read with the 2nd and 3rd sections, with regard to the effect of "neutral ballots," no declaration was made in respect of this Candidate, and the question was referred to Council, who directed that a legal opinion should be obtained thereon, which accordingly was done, and Mr. Matheson, q.c., has given his opinion that such "neutral ballots" should not be counted in the number of votes "in respect of" a Candidate.

The Vice-President in the Chair stated that he concurred in this construction of the By-Law, and accordingly declared

MR. FELIX CARBRAY

to be duly elected a member of the Academy.

The Academy having resumed the consideration of the recommendation of Council as to the alteration of By-Laws, Chapter II. :—

The Secretary (Rev. Dr. Bernard) moved, and Mr. Brennan seconded :—

"That before considering the details of the proposed alterations in the By-Laws, and the date at which they shall become Law, the Academy now proceed to discuss recommendation of the Council as to alteration of By-Laws (Chapter II.), relative to the election of Members, in so far as the following general principles are concerned :—

"(1) The election of Members once a year only :

"(2) The preparation by the Council of a select list of Candidates for Membership to be submitted to the Academy on the fourth Monday in February :

- “(8) The election by the Academy, at the Stated Meeting in March, of a number of Members not exceeding the number recommended by the Council.

Motion adopted.

The question having been discussed by several Members, Professor FitzGerald proposed, and Professor L. C. Purser seconded :—

“That the Academy do hereby approve the recommendation of the Council as to alteration of By-Laws (Chapter II.) relative to the election of Members, in so far as the following general principles are concerned :—

“(1) The election of Members once a year only :

“(2) The preparation by the Council of a select list of Candidates for Membership to be submitted to the Academy on the fourth Monday in February :

“(3) The election by the Academy, at the Stated Meeting in March, of a number of Members not exceeding the number recommended by the Council :—

The consideration of details being reserved for further discussion, and it being an instruction to the Council to furnish the Members of the Academy with a full statement as to all the detailed changes in the By-Laws which they propose.”

Carried.

The following Science Grants recommended by the Council were approved and adopted :—

£80 to a Committee, consisting of Dr. R. F. Scharff, Mr. F. W. Moore, Mr. R. L. Praeger, Mr. G. Pim, Prof. T. Johnson, Mr. G. H. Carpenter, Mr. G. E. H. Barrett-Hamilton, Mr. D. McArdle, Mr. A. R. Nichols, Mr. R. J. Ussher, and Mr. N. Colgan, to enable them to carry on their researches into the Fauna and Flora of Ireland during the present year.

£25 to a Committee, consisting of Prof. Cunningham, F.R.S., Prof. E. P. Wright, M.D., Prof. Haddon, F.R.S., and Dr. C. R.

Browne, to assist them in carrying on the work of the Anthropometrical Laboratory, and the Ethnographical Survey of Ireland.

£5 to Prof. Cole, to enable him to complete the Catalogue of the Scientific Periodicals contained in the various Public, or generally accessible, Libraries in Dublin.

The Treasurer read (in accordance with By-Law 3, Chapter III.) the list of Members in arrear. . . .

The Treasurer laid on the table:—

(a) The audited Accounts for 1899–1900.

(b) The Estimate for 1900–1.

MONDAY, JUNE 11, 1900.

MR. JOHN RIBTON GARSTIN, D.L., F.S.A., Vice-President, in the Chair.

Rev. Ambrose Coleman, O.P., was elected a Member of the Academy.

Rev. Dr. Lawlor read a Paper on “Archbishop Ussher’s Library before 1641.”

George Coffey, B.A.I., made a communication on “The present state of the question of a Copper Period transitional between the Stone and Bronze Ages in Europe.”

Donations to the Library were announced, and thanks voted to the Donors.

MONDAY, JUNE 25, 1900.

MR. JOHN RIBTON GARSTIN, D.L., F.S.A., Vice-President, in the Chair.

Rev. Ambrose Coleman signed the Roll, and was admitted a Member of the Academy.

Prof. C. J. Joly, F.R.C.D., read for Prof. Alex. Macfarlane, LL.D., F.R.S.E., a Paper on “Differentiation in the Quaternion Analysis.”

Thomas J. Westropp, M.A., read a Paper on “The Churches of Co. Clare, and the origin of the Ecclesiastical Divisions in that County.”

The Secretary of Council read for Rev. G. B. Buick, LL.D., a “Report on the Oghams at Connor, Co. Antrim.”

Donations were announced, and thanks voted to the Donors.

MONDAY, NOVEMBER 12, 1900.

DR. FRANCIS A. TARLETON, F.T.C.D., Vice-President, in the Chair.

The Queen's reply (communicated by the Home Secretary) to the Academy's Address presented to Her Majesty on the occasion of her recent visit to Ireland was read as follows :—

"I thank you heartily for the loyal and dutiful Address which you presented to me during my recent stay in Ireland.

"I am glad to recognize the success which has rewarded your efforts in the honourable task of fostering the pursuits of Science, Literature, and Archæology entrusted to you by my predecessor's charter."

The following resolution, proposed by Rev. Dr. Mahaffy, S.F.T.C.D., and second by Mr. T. J. Westropp, M.A., was passed unanimously :—

"The Members of this Academy desire to record their profound regret at the loss of their distinguished Honorary Member, Miss Margaret Stokes, whose labours on the Antiquities of Ireland are noble contributions to the history of our country."

Dr. Charles R. Browne read a Report on "The Ethnology of Mweenish and Carna in Connemara," and Mr. T. J. Westropp, M.A., read a Report on the Archæology of the same district.

By permission of the Academy, Professor Swift Paine Johnston, M.A., read a "Note on an Unpublished Letter ascribed to Bishop Berkeley."

Donations to the Academy were announced, and thanks voted to the Donors.

FRIDAY, NOVEMBER 30, 1900.

[STATED MEETING.]

Right Hon. THE EARL OF ROSSE, K.P., F.R.S., President in the Chair.

The consideration of the alterations in the By-Laws recommended by the Council for adoption by the Academy was resumed.

Dr. Atkinson rose to a point of order, viz. that the altered By-Laws had not been recommended to the Academy by the President

and Council, and asked for a ruling on the point. The President ruled that the recommendations of the Council were legally before the Academy, and that the consideration of them now was quite in order.

Dr. Atkinson then handed in the following protest :—

“ Dr. ATKINSON—

“ As Members of the Academy, beg to hand in a protest against any further proceedings in reference to the consideration of the alteration of the By-Laws, on the ground that such proceedings are invalid, as contravening the paragraph of the Charter, page 9, section 3, viz. ‘ Provided always that no rule or by-law once duly made and confirmed shall be repealed or altered except the motion for such repeal or alteration shall have been first approved of and proposed to the corporation by the President and Council of the said Academy,’ i.e. by the approval of twenty-two persons, viz. the President and Council, which such approval and proposal have not been brought forward and thereby the proceedings are invalidated.

“ I therefore appeal to the Visitor of this Academy to have a decision in this matter.

“ R. ATKINSON.

“ GEO. L. CATHCART.”

The following By-Laws were considered and approved, and confirmed by the Academy :—

Chapter II., sections 1, 3 (except that for “ time *of* payment” read “ time *for* payment”), 4, 6, 7, 8 (except that for “ this *limit* of, sixty” read “ this *number* of sixty”), 9, 10.

Chapter III., sections 1, 2, 3, 4.

Chapter IV., sections 1, 3, 6 (except sub-section (c), and in sub-section (e) for “ the names of such Members as shall ” read “ the names of such Members *of Council* as shall ”).

Chapter V., sections 1, 3, 8, 9.

Chapter VI., section 5.

Chapter VIII., section 6.

Chapter X., sections 5, 6, 7, 8.

Chapter XI., sections 4, 7, 17.

With respect to the following By-Law :—

CHAPTER II.

ELECTION AND ADMISSION OF MEMBERS.

1. *Ordinary Members.*

2. Every Candidate shall be proposed and recommended by a Certificate in writing signed by five or more Members, of whom two at least shall certify their recommendations from personal knowledge. The certificate shall specify the name, profession, qualifications, and usual place of residence of the Candidate, and when delivered to the Secretary shall be read out at the next ordinary Meeting and shall be hung up in a public room of the Academy. At the first ordinary Meeting of the Academy in February the names of all Candidates proposed subsequently to the Stated Meeting in March of the preceding year shall be read out by the Secretary from a list arranged in alphabetical order, and a copy of such list shall be sent to each Member with the Notice Paper for the Meeting next following. At the Council Meeting on the third Monday in February, the Council shall select by ballot from the printed list of Candidates a number not exceeding twelve to be recommended to the Academy for election. At such Meeting eleven Members at least must be present and voting; a majority deciding, or in the event of an equality the President or Chairman having a second or casting vote. At the Academy Meeting on the fourth Monday in February the President or Chairman shall read from the Chair the names of the Candidates whom the Council recommend, arranged in alphabetical order, and such select list shall be forwarded to each Member with the Notice Paper for the stated Meeting in March. At the Stated Meeting in March, at which there must be present and voting sixteen at least to form a quorum, each Member voting shall deliver to the Chairman one of the select lists, having erased the name of any Candidate or Candidates for whom he does not vote, and if he shall have thought fit, having substituted the name of any other Candidate or Candidates contained in the original printed list. If a Candidate not on the select list shall have received more votes than a Candidate on that list, the former shall be declared elected instead of the latter; and in the event of an equality of votes the President or Chairman shall have a casting

vote. And if no other Candidate on the original list shall have received a larger number of votes than the lowest given for any Candidate on the select list, each of the Candidates recommended by the Council shall be declared duly elected. Any Candidate who shall not have been elected shall, if any of his proposers so request in writing, continue a Candidate, and his name shall be placed in alphabetical order with those of the new Candidates to be announced in February following, and his Certificate shall be hung up along with those of the new Candidates.

It was proposed by Mr. Coffey, seconded by Dr. Haddon, and resolved—"That it be referred back to the Council to consider the suggestion that the full list of Candidates proposed be printed on the ballot paper, the names selected by the Council being distinguished in such manner as the Council may decide."

With respect to the following By-Law :—

CHAPTER IV.

ELECTION OF THE PRESIDENT, COUNCIL, AND OFFICERS.

4. The same person shall not be elected President more than five times in succession ; and the senior Member of the Committee of Science and of the Committee of Polite Literature and Antiquities, respectively, shall retire from the Council in each year :

It was proposed by Mr. Coffey, seconded by Dr. Haddon, and resolved—"That it be referred back to the Council to consider the suggestion that the two senior Members of each of the Committees of Council be retired each year."

With respect to the following sub-section of section 6, Chapter IV.

(c) In these lists the names of the Members whom the Council specially recommend as Candidates for vacant places shall be printed in capitals, the number of names so indicated not to be less than three or more than six for each Committee whatever the number of vacancies ; but every Member still retains his right to vote for any person whose name appears in the Balloting List.

It was proposed by Mr. Coffey, and seconded by Dr. Haddon—"That it be referred back to the Council, to consider the suggestion that capitalisation of Members to fill vacancies on Council be omitted."

It was proposed by Judge Kane, seconded by Mr. G. H. Kinahan, and resolved—"That it be referred back to the Council to consider the advisability of substituting for the words "three or more than six for each Committee whatever the number of vacancies" the words "two or more than three for each vacancy".

The following propositions were negatived:—

Proposed by Colonel Plunkett, and seconded by Mr. C. Litton Falkiner—"That (in By-Law 2, Chapter II.) it be referred back to the Council to consider the advisability of omitting the word "At," and inserting the words, "After receiving the Notice, and before the close of", and omitting the word "Chairman", and inserting, "to a duly authorized official of the Academy".

Proposed by Mr. G. H. Kinahan, and seconded by Mr. Leonard:—"That (in Chapter X., section 6) it be referred back to the Council to consider the advisability of adding to sub-section (a), the words, "and report to the Council the reasons why they recommend the paper to be published or rejected"—and to sub-section (b) the words, "and should state the special reason why the paper is specially qualified to be printed in the Transactions".

The President then declared that the foregoing By-Laws made or altered by the Council and recommended to the Academy, with the exception of By-Law 2, Chapter II., By-Law 4, Chapter IV., and sub-section (c) of By-Law 6, Chapter IV., having been approved and confirmed by the Academy, are along with the unamended By-Laws, with the omission of By-Law 3, Chapter VI. and Chapter XII., now operative By-Laws of the Academy.

MONDAY, DECEMBER 10, 1900.

PROFESSOR J. P. O'REILLY, C.E., in the Chair.

Rev. Philip O'Doherty and Rev. Joseph M'Keefry signed the Roll, and were admitted Members of the Academy.

A ballot having been opened for the election of a Member.

Dr. Atkinson asked the Chairman to rule if this election could legally be proceeded with, inasmuch as the By-Laws confirmed and approved by the Academy, and declared to be law from date of 30th November, provided that Candidates for Membership can only be elected at the Stated Meeting in March.

The Chairman ruled that the By-Law did not affect the cases of Candidates who had been proposed before the 30th of November.

The ballot was then proceeded with, and subsequently

Captain Joshua Fielding was duly elected a Member of the Academy.

Prof. Edward Perceval Wright, M.D., read a "Description of some of the Objects deposited in the Academy's Museum by the Royal Society of Antiquaries of Ireland."

Mr. Edward J. Gwynn, M.A., F.R.C.D., read the first of his Todd Memorial Lectures (Third Series), Subject:—"Poetical Dindshenchas of Druim nDairbrech, Lagin, Fid nGabli, Mag Life, and Berba."

MONDAY, JANUARY 14, 1901.

MOST REV. DR. DONNELLY, Lord Bishop of Canea, Vice-President, in the Chair.

Captain Joshua Fielding signed the Roll, and was admitted a Member of the Academy.

Mr. Thomas William Rolleston, M.A. (Dub.), Rev. William Morgan Tate-Stoate, M.A. (Dub.), and Sir Thomas Henry Grattan Esmonde, Bart., M.P., were elected Members of the Academy.

Mr. George Coffey read a Paper by Mr. J. M. Roberts, C.E., "On a Prehistoric Burial near Ardahan, Co. Galway." Dr. C. R. Browne made a report on the skulls found in the same place.

By permission of the Academy, Mr. David McArdle read a "Report on the Hepaticæ of the Dingle Peninsula."

The Secretary stated that it had been brought to his knowledge that some Members had not received the Notices for the meeting, which had been sent out, in due course, on Tuesday, the 8th instant, and suggested that, in courtesy to them, the consideration of the Resolutions of the Council of date December 17th should be postponed.

Prof. Cole pointed out that the matters referred to were urgent, and that it would be convenient to adjourn the meeting to an early date.

The Secretary accordingly proposed and Dr. Browne seconded, that the meeting do adjourn until Friday, the 18th instant, at Four o'clock; which, being carried, the Academy adjourned to that date.

FRIDAY, JANUARY 18, 1901.

(ADJOURNED MEETING.)

DR. F. A. TABLETON, F.T.C.D., Vice-President, in the Chair.

Mr. Coffey, asked if the business could be proceeded with, as sixteen Members were not then present.

The Chairman ruled that the quorum of sixteen was required by the Charter for the election of Members, but that such quorum was not necessary for other business.

In the absence of the Secretary of Council, the Secretary of the Academy brought up the recommendations of Council of December 17, 1900, and formally moved their adoption severally.

RESOLUTIONS OF COUNCIL (DECEMBER 17TH, 1900), WITH REGARD TO REFERENCES FROM THE ACADEMY ON 30TH NOVEMBER, 1900.

I. By-Law 2, Chapter II. (Election and Admission of Members):—

Reference from Academy—

“That it be referred back to the Council to consider the suggestion that the full list of Candidates proposed be printed on the ballot paper, the names selected by the Council being distinguished in such manner as the Council may decide.”

The paragraph to which the above refers is as follows :—

“ At the Stated Meeting in March, at which there must be present and voting sixteen at least to form a quorum, each Member voting shall deliver to the Chairman one of the select lists, having erased the name of any Candidate or Candidates for whom he does not vote, and if he shall have thought fit, having substituted the name of any other Candidate or Candidates contained in the original printed list.”

Mr. Coffey, moved as an Amendment, that the paragraph which was the subject of the Academy's former reference be referred back to the Council for further consideration.

Mr. Hamilton seconded.

The motion was lost.

The paragraph as recommended by the Council was then put and adopted in its unaltered form.

II. By-Law 4, Chapter IV. (Election of the President Council, and Officers.)

Reference from Academy—

“ That it be referred back to the Council to consider the suggestion that the two Senior Members of each of the Committees of Council be retired each year.”

The paragraph to which the above refers is as follows :—

“ 4. The same person shall not be elected President more than five times in succession; and the Senior Member of the Committee of Science and of the Committee of Polite Literature and Antiquities, respectively, shall retire from the Council in each year.”

The Council are of opinion that the alteration is undesirable and therefore recommend the adoption of the paragraph in the unaltered form.

Mr. Coffey, proposed as an Amendment that the paragraph which was the subject of the Academy's former reference be referred back to the Council for further consideration.

Mr. Hamilton seconded.

The motion was carried.

III. By-Law 6, Section (c), Chapter IV. :—

Reference from Academy—

“That it be referred back to the Council to consider the advisability of substituting for the words ‘three or more than six for each Committee whatever the number of vacancies’ the words ‘two or more than three for each vacancy’.”

The paragraph to which the above refers is as follows :—

“(c) In these lists the names of the Members whom the Council specially recommend as Candidates for vacant places shall be printed in capitals, the number of names so indicated not to be less than three or more than six for each Committee whatever the number of vacancies; but every Member still retains his right to vote for any person whose name appears in the Balloting List.”

The Council are of opinion that the alteration is desirable, and therefore recommend the adoption of the paragraph in the amended form.

The By-Law was adopted in the above form as recommended by the Academy on November 30th, 1890, and subsequently approved by the Council.

The following verbal alterations suggested by the Academy and approved by the Council, were adopted :—

By-Law 3, Chap. II.

Instead of “time of payment of his Entrance Fee,” read “time for payment”.

By-Law 8, Chap. II.

Instead of “This *limit* of sixty does not include Members of the Royal Family”, read “this *number* of sixty”.

By-Law 6, Section (c), Chap. IV.

Instead of “The names of such Members as shall be found to have attended less than fifteen Meetings”, read “The names of such Members of Council as shall”, &c.

The Chairman, then declared that Section 2, Chapter II. and Sub-Section (c), Section 6, of Chapter IV. were from this date operative By-Laws of the Academy.

MONDAY, JANUARY, 28, 1901.

MR. JOHN RISTON GARSTIN, D.L., F.R.S.A., Vice-President, in the Chair.

The Chairman formally announced the death of the Patron of the Academy, Her Majesty QUEEN VICTORIA, and moved that the Academy, as a mark of respect to Her Majesty's memory, do now adjourn: which, having been seconded by the Secretary, was passed in silence by the Members standing.

MONDAY, FEBRUARY 11, 1901.

Right Hon. The EARL OF ROSSE, K.P., F.R.S., President, in the Chair.

Mr. G. H. Kinahan, C.E., read a Paper entitled, "Notes on some Ancient Fartha."

Prof. L. C. Purser, LITT.D., F.T.C.D., read a Paper entitled, "Notes on Cicero's Correspondence during his Proconsulate."

Mr. Edward J. Gwynn, M.A., read his Second Todd Memorial Lecture. (Third Series.) Subject:—"The Dindshenchas of Moin gai glais, Almu, and Alend."

A Paper by Sir Robert S. Ball, F.R.S., "Further Developments of the Geometrical Theory of Six Screws," was read by the Secretary.

The Librarian reported the donation by Sir Charles Gavan Duffy of a valuable collection of books and manuscripts, and he moved:—

"That the best thanks of the Royal Irish Academy be given to Sir Charles Gavan Duffy, K.C.M.G., for his donation of books and manuscripts which deal with important epochs of Irish history, and which are rendered unique by the personal associations connected with them."

The motion was seconded by Rev. Dr. Hogan, S.J., and was carried unanimously.

Other donations were announced, and the thanks of the Academy voted to the Donors.

The Secretary of the Council proposed, and the Secretary of the Academy seconded, and it was resolved:—

“That the Council be requested to prepare, and lay before the Academy at its next meeting, an Address to His Majesty King Edward, expressing the Royal Irish Academy’s condolence with him on the death of Her late Majesty Queen Victoria, and offering the Academy’s congratulations to His Majesty on his accession to the Throne; and also expressing the hope that His Majesty will be pleased to assume the office of Patron of the Academy, which office has been held by His Royal Predecessors in succession from the founder King George III.”

The Secretary reported that the University of Glasgow had sent the following invitation to the Academy to send Delegates to the Celebration of the Ninth Jubilee of the University:—

CANCELLARIUS,

CURIA, SENATUS UNIVERSITATIS GLASGUENSIS ACADEMIAE REGIAE

HIBERNICAE.

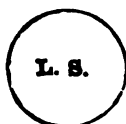
S.D.P.

SOLLENNE est sapientiae antistitibus signa contigerit laetitiae feriarumque occasio eam in medium deferre ut litteratorum Reipublicae concives piis gaudiis intersint universi. Communis enim inter studia communia fovescentes necessitudo. Atque hoc praesertim aevo cum tot stimulatium discordiarumque causae inter gentes intercedant, quam plurimi facimus fastorum opportunitatem per quam licet patria diversos litterarum commerciis inter se conjunctos ad doctum hospitium sodalitiumque convocare.

Sacra autem paramus saecularia cum haec nostra Glasguensis Academia natalem quadringentesimum quinquagesimum celebrare velit. Justum igitur saeculorum orbis rettulit tempus patribus conditoribusque nostris pio animo grataque memoria parentandi, Minervam simul per tantum aevi spatium feliciter navatam commemorandi. Equis enim divini scriptoris immemor? *Laudemus viros gloriosos et*

parentes nostros in generatione sua. Et nobis profuerunt homines divites in virtute, pulchritudinis studium habentes. Quippe anno post Chr. nat. millesimo quadringentesimo quinquagesimo primo Nicolaus V., Pontifex Maximus, non humilis ipse humanitatis fautor, reforescentium id temporis artium scientiarumque pro nostratibus oratorem Jacobum II. ex audit. Ergo a magna Roma matre lectae studiorum stirpes mox in terram novam digestae necnon multorum beneficiis atque liberalitate excultae in hanc tam nobilem Academiae molem creverunt. Longa deinde regum Scotorum series, inter quos honoris causa nominandus fundator ille alter Jacobus VI., viri doctissimi consiliis Andreae Melvini obsecutus, perpetuusque Maecenatium atque hujusce mercatura artibusque florentissimae Urbis favor *Studium illud Generale* auxit ditavitque.

Cum autem ad Bononiensis maximae Universitatis normam atque regulam ab initii placuerit doctrinae regimen accommodare, arctissima usque adhuc disciplinae rationisque scholasticae similitudo cum ceteris ubicumque Academiis communem affinitatem testatur. Quamobrem quasi nostro jure, humanissimi Collegae, Societatem vestram precamur ut legatos mittat quos gaudiis caerimoniisque nostris interfuturos mensis Junii die XII. laeti laetos excipiamus.



R. HERBERT STORY,

Praefectus et Vice-Cancellarius.

Dabamus a.d. VII. Id. Januar. MCM. Glasgae.

The Secretary of Council proposed, and the Secretary of the Academy seconded, and it was resolved:—

“That the invitation of the University of Glasgow to the Academy to send Representatives to the Celebrations on 12th, 13th, and 14th of June next of the Ninth Jubilee of the University be accepted, that the Delegates be appointed at the next meeting of the Academy, and that the Council be instructed to prepare and forward to the University an Address of Congratulation.

The Recommendation of the Council in reference to By-Laws, Chapter IV., that paragraph 4 should, in future, read thus—“4. The same person shall not be elected President more than five times in

succession ; and the two Senior Members of the Committee of Science and of the Committee of Polite Literature and Antiquities, respectively, shall retire from the Council in each year," was adopted by the Academy.

The President then declared that By-Law 4, Chapter IV., in the form printed above, was, from this date, the law of the Academy.

The following Grants in aid of Scientific Investigation, recommended by the Council, were approved :—

£10 to Prof. G. A. J. Cole, to enable him to complete his Catalogue of Scientific Periodicals contained in the various Public, or generally accessible, Libraries in Dublin.

£25 to Rev. H. J. Lawlor, D.D., to enable him to obtain Photographs of selected pages of Manuscripts of St. Columbanus in various Continental Libraries.

In accordance with By-Law 2, Chapter II., the Secretary read the following list of Candidates for Membership proposed since the amended By-Laws came into force :—

Matthew Wyatt Joseph Fry, M.A., F.T.C.D.

Right Hon. Dodgson Hamilton Madden, P.C., LL.D.

Edmond Joseph McWeeney, M.A., M.D.

Robert Patterson, F.Z.S.

Rev. William Ralph Westropp Roberts, M.A., B.D., F.T.C.D.

The President stated that Dr. Atkinson having requested him to reverse his ruling of 30th November, 1900, in reference to the point of order raised by two Members, and recorded on the Minutes, he was of opinion that it was not in his power to do so, and further that he believed his ruling to have been correct and in accordance with the intention of the Charter.

MONDAY, FEBRUARY 25, 1901.

JUDGE KANE, LL.D., in the Chair.

Mr. R. Lloyd Praeger, B.E., read a Paper on "Irish Topographical Botany."

Mr. W. J. Knowles read a "Further Report on Prehistoric Remains from the Sandhills of the Coast of Ireland."

Mr. Edward J. Gwynn, M.A., read his Third Todd Memorial Lecture (Third Series). Subject:—"Some Fenian Poems from the Dindshenchas."

The Secretary read for Mr. Thomas J. Westropp, M.A., "The Cahers of County Clare. Their Names and Bibliography."

The Librarian exhibited a Manuscript Copy of the New Testament written in Ireland in the seventeenth century, presented to the Library by R. B. Armstrong, Esq.

Donations to the Library were announced, and thanks voted to the Donors.

The following Address to the King, prepared by the Council in accordance with the Academy's resolution of 11th instant, was approved and ordered to be transmitted:—

TO THE KING'S MOST EXCELLENT MAJESTY.

THE HUMBLE ADDRESS OF THE PRESIDENT AND MEMBERS OF THE
ROYAL IRISH ACADEMY.

MAY IT PLEASE YOUR MAJESTY,

We, the President and Members of the Royal Irish Academy, desire to offer our assurances of loyal attachment to your Majesty's throne and person, on the occasion of your Majesty's happy accession to the Crown of these realms, and respectfully to express our sense of the great loss which the Empire has sustained through the death of our late Patroness, Her Majesty QUEEN VICTORIA.

We had the privilege of presenting an Address of Welcome to Her Majesty on her recent visit to Ireland, and in her gracious reply Her Majesty was pleased to say:—"I am glad to recognize the success which has rewarded your efforts in the honourable task of fostering the pursuits of Science, Literature, and Archæology, entrusted to you by my Predecessor's Charter."

We venture to hope that the Royal favour which the Academy has now enjoyed for more than a century will not be withdrawn, and that Your Majesty will be pleased to assume the office of Patron, which has been held by the Sovereign since the Academy's Incorporation by Your Majesty's Royal Ancestor, King George the Third.

The appointment of delegates to represent the Academy, at the Ninth Jubilee of the University of Glasgow, was postponed to the next Meeting of the Academy.

In accordance with By-Law 2, Chapter II., the Chairman read from the chair, the names, arranged in alphabetical order, of the Candidates recommended by the Council for election as Members of the Academy, viz. :—

Matthew Wyatt Joseph Fry, M.A., F.T.C.D.

Right Hon. Dodgson Hamilton Madden, F.C., LL.D.

Edmond Joseph M^cWeeney, M.A., M.D.

Robert Patterson, F.Z.S.

Rev. William Ralph Westropp Roberts, M.A., B.D., F.T.C.D.

SATURDAY, MARCH 16, 1901.

(STATED MEETING).

RIGHT HON. THE EARL OF ROSSE, K.P., F.R.S., President in the Chair.

The President nominated as Scrutineers for the Ballot for President and Council, the following Members :—Mr. Mills, Mr. M^cEnery, Mr. C. L. Falkiner, and Mr. J. P. Johnston.

The Secretary, at the request of the President, called attention to the change in the balloting regulations.

Mr. Garstin proposed, and the Rev. Dr. Bernard seconded, Dr. Atkinson as a fit person to fill the office of President.

Mr. D. R. Pigot proposed, and Mr. G. H. Kinahan seconded, the Most Rev. Dr. Donnelly, Bishop of Canea, for the same office.

The ballot was then declared open.

Dr. Woollcombe and Mr. F. E. Ball were appointed Scrutineers for the ballot for Ordinary Members, which was then declared open.

The Treasurer and Mr. Cathcart were appointed Scrutineers for the ballot for Honorary Members, which was then declared open.

Dr. Atkinson proposed, and Dr. Williamson seconded, that the Rev. Dr. Bernard, Secretary of the Academy, and Mr. C. J. Joly, Royal Astronomer of Ireland, be appointed as Delegates of the Academy to the Ninth Jubilee Celebration at the University of Glasgow, in June, 1901.

The resolution was carried.

The Secretary of the Council read the following :—

REPORT OF THE COUNCIL FOR THE YEAR 1900-1.

Since the date of the last Report the following Publications of the Academy have been issued :—

Transactions, vol. xxxi.

Part 8. "The Latent Heat of Evaporation of Steam from Saturated Salt Solutions." By Frederick T. Trouton, sc.d., f.r.s.

Part 9. "Properties of the General Congruency of Curves." By Charles Jasper Joly, m.a.

Part 10. "The Kilcormac Missal": a Manuscript in the Library of Trinity College, Dublin. By Rev. Hugh Jackson Lawlor, d.d.

Proceedings.

Of the *Proceedings*, Third Series, Part 4 of Vol. v. was published in March, 1900, and contained the following Papers :—

"A List of the Marine Mollusca of Ireland." By A. R. Nichols, b.a.
(Report from the Fauna and Flora Committee.)

"Some Properties of the General Congruency of Curves." (Abstract.)
By Charles J. Joly, m.a.

"Some Applications of Hamilton's Operator ∇ in the Calculus of Variations." By Charles J. Joly, m.a.

And of the same Volume, Part v., completing the Volume, was published in June, and contained the following :—

"The Fauna and Flora of Valencia Harbour on the West Coast of Ireland," viz. :—

I.—*The Pelagic Fauna*.

i. The Pelagic Fauna (1895-8). By Edward T. Browne, b.a.

ii. The Medusæ (1895-98). By Edward T. Browne, b.a.

- III. The Free-Swimming Copepoda (1895-98). By Isaac C. Thompson, F.L.S.
- IV. The Chætognatha. By F. W. Gamble, M.Sc.
- V. The Pelagic Tunicata. By Prof. W. A. Herdman, F.R.S.
- VI. On young Stages of Teleosteans. By J. T. Cunningham, M.A.

II.—*The Benthos (Dredging and Shore Collection).*

- VII. The Results of Dredging and Shore-collecting. By W. I. Beaumont, B.A.
- VIII. The Algæ. By Prof. F. E. Weiss, B.Sc.
- IX. The Lucernaridæ. By W. I. Beaumont, B.A.
- X. The Turbellaria. By F. W. Gamble, M.Sc.
- XI. The Nemertea. By W. I. Beaumont, B.A.
- XII. The Opisthobranchiate Mollusca. By W. I. Beaumont, B.A.

And the 1st Part of Volume vi. was published in October, containing the following Papers:—

- “On the First Mitosis of the Spore-Mother-Cells of *Lilium*.” By Henry H. Dixon, Sc.D.
- “On the Place of the *Ausdehnungslehre* in the General Associative Algebra of the Quaternion Type.” By Charles J. Joly, M.A.
- “On the Epidiorite and Mica Schists of Killiney Park, Co. Dublin.” By Professor J. P. O'Reilly, C.E.
- “The Beaufort's Dyke, off the Coast of the Mull of Galloway.” By G. H. Kinahan, C.E.
- “The Earliest Periodical Journals published in Dublin.” By E. R. M'Clintock Dix.
- “The Milesian Colonization considered in relation to Gold-mining.” By J. P. O'Reilly, C.E.
- “The *Dextera Dei* Sculptured on the High Crosses of Ireland.” By Francis Joseph Bigger.
- “Dolmens at Ballycroum, near Feakle, County Clare.” By T. J. Westropp, M.A.

"On the Reduction of an Integral." By Rev. W. R. W. Roberts, B.D.

"The Churches of County Clare, and the Origin of the Ecclesiastical Divisions in that County." By T. J. Westropp, M.A.

And Part 2 of this Volume will be issued immediately, containing the following Papers:—

"Degenerations resulting from Lesions of the Cortex of the Temporal Lobe." By W. H. Thompson, M.D., Dunville Professor of Physiology, Queen's College, Belfast.

"Differentiation in the Quaternion Analysis." By Alexander Macfarlane, D.Sc., LL.D.

"Primate Ussher's Library before 1641." By Rev. H. Jackson Lawlor, D.D.

"Report on the Ogams recently discovered near Connor, Co. Antrim." By Rev. G. R. Buick, LL.D.

"Supposed Autograph Letter of Bishop Berkeley in the Library of the Royal Irish Academy." By Swift P. Johnston, M.A.

"Report on the Island Ogam at Bracklaghboy, near Ballyhaunis." By Professor Rhys, M.A.

The following Grants in aid of Scientific Investigation, recommended by the Council, were sanctioned by the Academy:—

£80 to a Committee, consisting of Dr. R. F. Scharff, Mr. F. W. Moore, Mr. R. L. Praeger, Mr. G. Pim, Prof. T. Johnson, Mr. G. H. Carpenter, Mr. G. E. H. Barrett-Hamilton, Mr. D. M'Ardle, Mr. A. R. Nichols, M. R. J. Ussher, and Mr. N. Colgan, to enable them to carry on their researches into the Fauna and Flora of Ireland during the present year.

£25 to a Committee, consisting of Prof. Cunningham, F.R.S., Prof. E. P. Wright, M.D., Prof. Haddon, F.R.S., and Dr. C. R. Browne, to assist them in carrying on the work of the Anthropometrical Laboratory, and the Ethnographical Survey of Ireland.

£15 to Prof. Cole, to enable him to complete the Catalogue of the Scientific Periodicals contained in the various Public, or generally accessible, Libraries in Dublin.

£25 to Rev. H. J. Lawlor, D.D., to enable him to obtain Photographs of Selected Pages of Manuscripts of St. Columbanus in various Continental Libraries.

Considerable further progress has been made during the past year in the preparation of slips for the Irish Dictionary, under the direction of the Editor.

The Todd Lectures for 1899-1900, both text and translation, are in the press, and will be ready for publication shortly, and they will, it is hoped, be followed at no distant date by the volume containing the Course of Lectures for the Session 1900-1, the last of which will be delivered this day.

The Council are glad to be able to report that the fourth volume of the *Annals of Ulster*, containing the Introduction and Index, and completing the entire work, is now finished, and will be ready for publication within the next few days.

Rev. Dr. Gwynn, editor of the Book of Armagh, reports as follows:—

The printing of the Book of Armagh is far advanced towards completion. The whole of the New Testament, being the largest and most important part of it, is now in type, and the sheets are herewith laid before the Academy. The manuscript has been represented as intended by Bishop Reeves, “not only *paginatim* but *lineatim*”; so that the printed book will be, for all practical purposes, a facsimile of it. The initial letters and other ornamental devices, some of them of great beauty, have been reproduced by a photographic process, with considerable success. The printing of the remaining sheets, which will contain the Patrician documents and the Life of St. Martin, will, it is hoped, be speedily finished. An Introduction, including the admirable account of the MS. left by Dr. Reeves, and an Appendix of readings of the Gospel text from the Books of Dimna and Mulling will complete the work.

The Annual Visitation of the Academy's Museum took place on the 13th February, 1901. The Committee appointed for that purpose report that, in their opinion, the North-west Pavilion is insufficiently lighted, and they hope that arrangements may be made by which light during

the daytime may be more effectively secured, and the electric lighting at night improved. In this room the Croziers are now exhibited in the form suggested by the Curator, which the Visitation Committee approve of. In the Long Room the Bronze Celts have been arranged and re-classified, so as to exhibit them in a more desirable manner.

The revision of the By-laws, which was undertaken by a Committee appointed by the Council on 21st December, 1896, and subsequently reappointed on 20th March, 1899, occupied much of the attention of the Council during the past year. The Revision Committee made a report to the Council on the 9th March, 1900, which was taken into consideration on the 7th of May following. On that date the Council recommended to the Academy the By-laws proposed by the Revision Committee, in reference to the election of Members, and these having been brought before the Academy on 14th of May, were discussed, and at a subsequent Meeting, on May 28th, were adopted in principle, the consideration of details being reserved until a full statement as to all the proposed changes in the By-laws had been prepared by the Council. The Council had this matter before them again on 18th June, 5th November, 19th November, and 22nd November; and on the last-named date they adopted a series of important recommendations, which were brought before the Academy on 30th November, and approved, with the exception of three paragraphs, which were referred back to the Council. Some modifications having been made in two of these paragraphs, after consideration by the Council, on 17th December, 1900, and 21st January, 1901, the revised By-laws received the final sanction of the Academy on 11th February, 1901. A copy of the By-laws, thus revised, has already been sent to every Member of the Academy.

At the beginning of last year the Eclipse Committee, appointed by the Royal Irish Academy and the Royal Dublin Society, found that the number of persons likely to join the expedition was very much less than had been anticipated. They did not therefore feel themselves justified in recommending that a special steamer should be chartered, and they accepted provisionally an offer made by the British Astronomical Association of berths on their steamer for the Irish members. Only thirteen, out of 150 members who had made provisional applications for berths, accepted this offer. Ultimately the British

Astronomical Association were unable to charter a steamer. The failure in both cases is attributed to the war in South Africa.

Under these circumstances the Committee gladly accepted an offer courteously made by Señor Don Iniguez y Iniguez, the Director of the Madrid Observatory, that the Irish observers should occupy a station at the Plasencia, in the interior of Spain, in proximity to that occupied by the Spanish Government Astronomers. A preliminary account of the observations, which are considered to be very satisfactory, will be communicated to the Societies at an early date.

The following Members have been elected since the 16th March, 1900:—

Ambrose Birmingham, M.D.
Felix Carbray, M.P.P.
Rev. Ambrose Coleman, O.P.
Sir Thomas Henry Grattan Esmonde, Bart., M.P.
Captain Joshua Fielding.
Rev. Henry Francis John Martin, M.A.
Prof. Stanley Lane Poole, M.A.
Thomas William Rolleston, M.A.
Rev. William Morgan Tate-Stoate, M.A.

The Academy has lost by death within the year six Members:—

Rev. Edmond Barry, P.P., elected 28th June, 1866.
G. F. FitzGerald, D.Sc., F.R.C.D., F.R.S., elected 11th Feb., 1878.
Henry Hennessy, F.R.S., elected 13th January, 1851.
Edmond Johnson, elected 11th January, 1897.
Rev. Thomas Olden, M.A., elected 14th February, 1876.
F. J. B. Quinlan, M.D., elected 11th April, 1881.

The Academy has also lost by death one Honorary Member in the Section of Science:—

Charles Hermite, elected 15th March, 1884.

And three Honorary Members in the Section of Polite Literature and Antiquities:—

Right Hon. Max Müller, elected 16th March, 1863.
Lieut.-General Augustus H. L. F. Pitt-Rivers, elected 16th March, 1895.
Margaret Stokes, elected 16th March, 1876.

It is not usual to give in this Report a special notice of Honorary Members, but it is impossible to pass over one honoured name without at least a brief reference to the quality and nature of that Member's work. The name of Margaret Stokes has long been a household word in the archæological world, but, to the Royal Irish Academy, it is even more familiar as the name of the powerful exponent of the claims of Irish Archæology to the notice of scholars and of the world at large. Miss Stokes' work in this large field, where the harvest is plenty and the labourers are so few, has not been unnoticed by this Academy, which brought out in 1898 a beautiful volume of her most characteristic work on the High Crosses of Ireland. This work it was hoped she might have been spared to carry to its completion in a full treatise on Irish Iconography, but this was not to be. Fortunately, another instalment of the preparatory studies was completed before her death, and its speedy publication will enable the scientific world to judge of the loss that has befallen the science of archæology by her lamented death in September, 1900. The work may be taken up and continued by others on the basis of her initiative and with the stimulus of her inspiration, but it will be hard to find again the same passionate devotion to the object of her study, and the same artistic excellence in the elaboration of her work.

By the death of George Francis FitzGerald on the 22nd of February, 1901, the work of a valued labourer in the field of science and also in the cause of education has been prematurely brought to a close. Son of the Bishop of Killaloe, he was born in Dublin in 1851. He was educated at home by private tuition, and entered Trinity College in 1867, at the age of sixteen. Ten years afterwards (1877) he gained Fellowship in the College; and in 1881, he was appointed to the Erasmus Smith Chair of Experimental Philosophy in the University, in which post he remained till his death. In 1881 he was President of Section A. (Mathematics and Experimental Physics) of the British Association, and was elected in 1883 a Fellow of the Royal Society, receiving from that Society a Royal Medal in 1899. He became a member of the Royal Irish Academy in 1878, and served on the Council from 1879 till 1883.

It is impossible to enter here on a detailed estimate of his labours either in the prosecution of scientific research or on behalf of educa-

tion, in which he took a deep and thoughtful interest. His scientific papers, many of which appeal only to that very limited circle of students who possess the highest gifts alike of the physicist and of the mathematician, were not published in the Royal Irish Academy, where his work was principally directed to organizing and aiding the magnetic observations and experiments which the Academy promoted at Valencia.

He was an acknowledged authority on nearly every branch of physical science—optics, thermodynamics, the theory of solutions, molecular physics—all were enriched by papers from his pen. His name is perhaps best known as an exponent of the electro-magnetic theory of light, and as a leader in æther-theory.

To judge from the many acknowledgments of his great sympathy and peculiar helpfulness that will be found in contemporary memoirs in different branches of physical science, his death will be felt as a personal loss, not only by his colleagues and associates, but also by scientific men throughout the world.

Henry Hennessy, born in 1826, held for some years the Chair of Natural Philosophy in the Catholic University of Ireland, and, in 1874, he was appointed to the Chair of Applied Mathematics in the Royal College of Science for Ireland. He became a Member of the Academy in 1851, and served on the Council from 1867 to 1874. He was elected a Fellow of the Royal Society in 1858.

His Papers published by the Academy were:—

1867 On the Distribution of Temperature in the Lower Region of the Earth's Atmosphere. *Trans.*, vol. xxiv, Science.

And, in the *Proceedings*, the following:—

1849 On the Influence of the Earth's Figure on the Distribution of Land and Water at its Surface.

1856 On the Causes of certain Phenomena observed in Lough Erne.

„ On Meteorology.

„ On the Influence of Latitude on the Position of the Isothermal Lines at the Surface of the Earth.

„ On the Influence of the Earth's internal Structure on the Length of the Day.

1860 On a Theorem relating to Conical Surfaces.

1861 On Clairaut's Theorem.

„ On the Connexion between Storms and Vertical Disturbances of the Atmosphere.

1867 On the Formation of Ground Ice in the Bed of the River Dodder.

„ On the Origin of the South European Plants found growing in the West and South of Ireland.

1868 On the Physical Conditions of Climate during different Geological Epochs.

„ Note on two Streams flowing from a common Source in opposite Directions.

1869 On the "Föhn" in the Alps and its Connexion with the Glacier Theories.

1870 Addition to the Note on two Streams flowing from the same Source in opposite Directions.

1871 On the Flotation of Sand by the Rising Tide in a Tidal Estuary.

1872 Notes of Observations of Phenomena in Optical Meteorology.

1873 On an inverted Lunar Halo and a Lunar Rainbow.

„ Note on additional Instances of the Tidal Flotation of Sand.

1877 Experiments to determine the Influence of the Molecular Condition of Fluids on the Motion when in Rotation, and in Contact with Solids.

1886 On the Fluid State of Bodies composing our Planetary System.

„ On the Distribution of Temperature over Great Britain and Ireland.

The Report was adopted.

The Fourth Volume of the "Annals of Ulster," completing the entire work, and the New Testament portion of the "Book of Armagh," were laid on the table, unbound.

By-Law 6, Chapter IX., having been suspended, Mr. E. J. Gwynn, M.A., read his Fourth Todd Memorial Lecture (Third Series) on "Fenian Poems from the Dindshenchas."

Mr. Garstin exhibited two rubbings of sixteenth-century inscribed tomb-stones from Kilcooley Abbey, Co Tipperary; one from the tomb of a member of the Butler family, now represented by the Earls of Carrick; and the second from the tomb of one William Cantwell.

The Scrutineers having reported the result of the ballot for Ordinary Members,

Matthew Wyatt Joseph Fry, M.A., F.T.C.D.,

Right Hon. Dodgson Hamilton Madden, F.C., LL.D.,

Edmond Joseph M'Weeney, M.A., M.D.,

Robert Patterson, F.R.S.,

Rev. William Ralph Westropp Roberts, M.A., B.D., F.T.C.D.,

were declared duly elected Members of the Academy.

On the report of the Scrutineers,

Felix Klein,

Hermann Karl Vogel,

were declared duly elected as Honorary Members in the Section of Science.

On the Scrutineers' report the President and Council for the ensuing year were declared duly elected as follows:—

PRESIDENT.

ROBERT ATKINSON, LL.D., LITT.D.

COUNCIL.

Committee of Science.

George L. Cathcart, M.A.

Robert F. Scharff, B.Sc., PH.D.

Greenwood Pim, M.A.

Grenville A. J. Cole, F.G.S.

Charles J. Joly, M.A.

Frederick W. Moore, F.L.S.

Frederick T. Trouton, D.Sc., F.R.S.

Right Hon. The Earl of Rosse, K.P., F.R.S.

Joseph P. O'Reilly, C.E.

Francis A. Tarleton, LL.D., D.Sc.

Benjamin Williamson, D.Sc., F.R.S.

Committee of Polite Literature and Antiquities.

Rev. Maxwell H. Close, M.A.
 Lord Walter Fitz Gerald.
 Rev. J. H. Bernard, D.D.
 John Ribton Garstin, M.A., F.S.A.
 Thomas J. Westropp, M.A.
 Rev. Edmund Hogan, S.J., D.LITT.
 Robert Cochrane, F.S.A.
 Stanley Lane-Poole, LITT. D.
 Louis C. Purser, M.A., LITT. D.
 Most Rev. Bishop Donnelly, D.D.

[Bishop Donnelly and Mr. Edward J. Gwynn having received an equality of votes, the President gave his casting vote in favour of Bishop Donnelly.]

The outgoing President (The Earl of Rosse) here vacated the chair, and it was taken by Dr. Atkinson.

A ballot was opened for the election of Officers—Dr. Tarleton and Mr. Cathcart being appointed Scrutineers—and subsequently the following were declared duly elected :—

TREASURER—Rev. M. H. Close, M.A.
 SECRETARY—Rev. J. H. Bernard, D.D.
 SECRETARY OF THE COUNCIL—Stanley Lane-Poole, LITT. D.
 SECRETARY OF FOREIGN CORRESPONDENCE—Robert F. Scharff, PH.D.
 LIBRARIAN—Grenville A. J. Cole, F.G.S.
 ASSISTANT SECRETARY—Robert Macalister, LL.B.

The President, under his hand and seal, nominated the following as Vice-Presidents for 1901-2 :—

Francis A. Tarleton, LL.D., F.T.C.D.
 Joseph P. O'Reilly, C.E.
 Most Rev. Bishop Donnelly, D.D.
 John Ribton Garstin, D.L., F.S.A.

The Academy then adjourned.

MONDAY, APRIL 22, 1901.

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Minutes of last meeting read.

A division being taken on the question "That the Minutes be confirmed," on the motion of Mr. Leonard the names of the voters were recorded as follows :—

For the motion :—

Dr. Woolcombe.
Rev. Dr. Bernard.
Dr. Joyce.
Mr. Craig.
Rev. Dr. Hogan.
Mr. Brenan.
Dr. Williamson.
Rev. M. H. Close.
Dr. L. C. Purser.

Dr. Scharff.
Mr. F. E. Ball.
Mr. Westropp.
Dr. Lane-Poole.
Mr. O'Reilly.
Most Rev. Dr. Donnelly.
Mr. Moore.
Rev. W. Reynell.

Against the motion :—

Mr. Bell.
Rev. F. M'Enerney.
Mr. M'Henry.

Mr. Leonard.
Mr. Gore.
Mr. G. H. Kinahan.

The Minutes were confirmed accordingly.

Dr. P. J. Barry signed the Roll and was admitted a Member of the Academy.

Professor J. P. O'Reilly, c.z., read a Paper on "The mode of Ringing or Sounding Bells in the early Churches of Northern Spain and of Ireland."

Mr. Thomas J. Westropp, m.a., read a Paper on "The Ancient Forts of Ireland, their plans and structural features."

Donations were reported, and thanks voted to the donors.

“GÖTTINGEN, 29. III. 1901.

“HOCHGEHETER HERR SECRETÄR!

“Die hohe Auszeichnung, welche mir Ihre Akademie hat zu teil werden lassen, ist mir ebenso überraschend gekommen, als sie mir besondere Freude macht. In der That habe ich mich der Dubliner Tradition insofern immer besonders verbunden gefühlt, als dort der Sinn für geometrische Anschauung von je hervorragende Pflege fand. Ich nenne hier nur die Namen Hamilton, M'Cullagh, und Salmon, denen ich ausserordentlich viel verdanke.

“Wollen Sie, hochgeehrter Herr Secretär, Ihrer Akademie in diesen Sinne meinen lebhaften Dank für Ihre Ernennung aussprechen; ich verbleibe mit ausgezeichneter Hochachtung.

“Ew. Hochwohlgeboren ganz ergebener,

“F. KLEIN.”

“KÖNIGLICHES ASTROPHYSIKALISCHES OBSERVATORIUM,

“POTSDAM, 25. März. 1901.

“MR. JOHN H. BERNARD, D.D.,

“SECRETARY OF THE ROYAL IRISH ACADEMY.

“SEHR GEEHETER HERR!

“Das mir mit dem gefälligen Schreiben vom 16. d. Mts. übersandte Diplom habe ich erhalten und bitte Sie, der Königlich Irischen Akademie für die hohe Ehre, die sie mir durch die Wahl zum Ehrenmitgliede erwiesen hat, meinen verbindlichsten Dank auszusprechen.

“In vorzüglichster Hochachtung,

“Ihr sehr ergebener,

“H. C. VOGEL.”

A letter was read from Mr. G. H. Kinahan asking for a scrutiny of the votes given for President and Council at the Stated Meeting on March 16th.

The President ruled that such a scrutiny could not now be granted, and that Mr. Kinahan be so informed.

A notice of motion handed in by Mr. Leonard on the same subject was ruled out of order by the President.

Notices of motion by Mr. Coffey were handed in as follows :—

“That the Council be requested to report to the Academy the position of the controversy respecting the Gold Antiquities lately found in the north of Ireland, and the steps they have taken to secure the return of these Antiquities to Ireland.”

“That a revision of the By-Laws is desirable for the purpose of simplifying the method and defining the conditions of the election of President and Council.”

MONDAY, MAY 13, 1901.

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Sir Thomas H. Grattan Esmonde, Bart., M.P., and Rev. William R. Westropp Roberts, B.D., F.T.C.D., signed the Roll, and were admitted Members of the Academy.

Mr. C. Litton Falkiner, M.A., read a Paper on—“The Phoenix Park, its origin, formation and early history; with some notices of its Royal and Viceregal residences.”

Rev. M. H. Close, M.A., read a Paper—“Hipparchus and the Precession of the Equinoxes.”

Donations to the Library were announced, and thanks voted to the Donors.

Read the following letters :—

“HOME OFFICE, WHITEHALL,
“3rd April.

“MY LORD,

“I am commanded by the King to convey to your Lordship hereby His Majesty's thanks for the Loyal and Dutiful Address of the of the President and Members of the Royal Irish Academy expressing

Sympathy on the occasion of the lamented death of Her late Majesty Queen Victoria, and congratulation on His Majesty's Accession to the Throne.

"I have the honour to be, My Lord,

"Your Lordship's obedient Servant,

"CHAS. T. RITCHIE.

"THE RIGHT HON. THE EARL OF ROSSE, K.P., &C.,

"BIRN CASTLE, PARSONSTOWN,

"KING'S COUNTY, IRELAND."

"PRIVY PURSE OFFICE,

"BUCKINGHAM PALACE,

"8th May, 1901.

"SIR,

"I have the honour to inform you that I have submitted to the King your letter of 2nd inst., and in reply I am commanded to say that His Majesty is pleased to accede to the request contained in it, to grant his Patronage to the Royal Irish Academy.

"I am, Sir,

"Your obedient Servant,

"D. M. PROBYN, *General*,

"Keeper of H. M.'s Privy Purse.

"THE SECRETARY,

"THE ROYAL IRISH ACADEMY."

An invitation to appoint a delegate to the International Congress of Zoology to be held at Berlin in August, 1901, was accepted, and Dr. Scharff was appointed the Academy's delegate on the occasion.

Mr. Coffey moved, in accordance with notice handed in at the last meeting of the Academy:—

"That the Council be requested to report to the Academy the position of the controversy respecting the Gold Antiquities lately found in the North of Ireland, and the steps they have taken to secure the return of these Antiquities to Ireland."

Judge Kane seconded the motion.

The Secretary proposed as an amendment that the words "at the next meeting" be inserted after the word "Academy".

Sir Thomas Esmonde seconded the amendment. This was carried, and the amendment was subsequently passed as a substantive resolution.

Mr. Coffey moved in accordance with notice handed in at the previous meeting of the Academy:—

"That a revision of the By-Laws is desirable for the purpose of simplifying the method and defining the conditions of the election of President and Council."

While Mr. Coffey was speaking, the hour being late, Sir Thomas Esmonde moved the adjournment of the debate, which Judge Kane seconded, and it was passed.

Sir Thomas Esmonde called the attention of the Academy to the fact that it was reported that the Mias Tighernain was to be disposed of.

A letter from Mr. G. H. Kinahan, relative to the election of 16th March, was ruled out of order.

The Treasurer laid on the table the audited Accounts for 1900-1, and the estimate for 1901-2.

MONDAY, JUNE 10, 1901.

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Prof. Edmund J. McWeeney, M.D., signed the Roll, and was admitted a Member of the Academy.

Dr. F. T. Trouton, F.R.S., read a Paper on—"The Creeping of Liquids and the Surface Tension of Mixtures."

Rev. M. H. Close, M.A., read—"Remarks on a Cosmographical Tractate in the Irish Language in the Library of the Academy."

Donations to the Library were announced, and thanks were voted to the Donors.

A letter was read stating that the Mias Tighernain, referred to at the last meeting of the Academy, was not at present in the market.

In Mr. Coffey's absence, the Secretary moved that the discussion of Mr. Coffey's motion—"That a revision of the By-Laws is desirable for the purpose of simplifying the method and defining the conditions of the election of President and Council," be adjourned until the first meeting of the Academy in November next. Passed.

Read the following :

**MINUTES AND CORRESPONDENCE RELATING TO THE
GOLD ANTIQUITIES FOUND NEAR LIMAVADY IN
1896.**

Council, 1st February, 1897.

[Attention of Council called to report in the *Athenæum* of Jan. 30, 1897, of a Paper by Mr. Arthur Evans, read at a meeting of the Society of Antiquaries, London, on a remarkable hoard of gold objects found in the North of Ireland.]

Resolved—"That the subject of the find of gold ornaments be referred to the Committee of Polite Literature and Antiquities, with power to communicate with the Crown Solicitor on the matter."

P. L. & A. Com., 5th Feb., 1897.

[Reference from Council considered.]

The Secretary of Council informed the Committee that he had had an interview with the Chief Crown Solicitor, in which he had laid before him the circumstances of the case so far as they had come to his knowledge. The Crown Solicitor stated that the great hindrance to definite action being then taken lay in the absence of precise information as to the place where the objects were found, the name of the finder, and the circumstances of the finding. The Secretary pointed out that these were matters which the Academy had no machinery for ascertaining, and that in all such cases it must be left to the Executive.

The Academy Council had accordingly drawn attention to the case.

The following Minute was adopted :—

"After hearing that there was good reason to believe that the Crown Solicitor had already been put in motion on the matter, it was resolved—That the matter be deferred to a subsequent meeting, to be summoned when more definite information has been obtained."

No definite information as to the finding was, however, obtained in the interval, and towards the close of the year the Council heard that the objects had been sold to the British Museum.

On the appearance of the volume of *Archæologia*, in January, 1898, in which the Paper by Mr. Evans appeared, it was found that even in it no definite statements were furnished as to the circumstances of the finding.

Accordingly at the meeting of

Council, 7th February, 1898.

It was proposed :—

“That a Committee consisting of the officers of the Academy, Dr. Bernard and Mr. Garstin, be appointed to consider the recent sale of gold ornaments, found in Ireland, to the British Museum, with instruction to take the advice of Counsel as to the steps most desirable for the Academy to pursue, and to report to the next meeting of the Council if possible.”

Amendment proposed :—

“That the Committee of Polite Literature and Antiquities be requested to report promptly to the Council with reference to the gold ornaments from Ireland recently bought for the British Museum, and that the officers be summoned to confer with the Committee.”

Amendment lost; original motion carried.

Special Committee, 15th February, 1898.

“The Committee having considered all the circumstances of the case, so far as they could, from an examination of all the documents at their disposal bearing thereon, do not see that any advantage would be derived from taking an opinion of Counsel as to the steps desirable for the Academy to pursue.

They beg, however, to report that in their judgment it is highly desirable and urgent to call the attention of the Irish Government to the fact that there has apparently been a breach of the arrangement under which Treasure Trove found in Ireland comes to be placed, for the public benefit, in the Museum of the Royal Irish Academy in Dublin.”

Council, 21st February, 1898.

[Report of Special Committee read.]

“The Secretary of Council brought up a series of Memoranda in reference to the above matter, and the Council on deliberation resolved—that the Committee which has already reported on the find of gold ornaments in the north-west of Ireland be instructed to prepare a Memorial in the name of the Council to be transmitted to the Lord Lieutenant, embodying the substance of the above Memoranda with such additions as the Committee on consideration may deem desirable, and that the Committee be authorised to forward the Memorial on behalf of the Council.”

7th March, 1898.

Memorial forwarded to the Lord Lieutenant.

The Text of this Memorial will be found in Minutes of Proceedings (pp. 287–291), Royal Irish Academy, vol. iv., 3rd Series, and as “Appendix III.” (page 40) of the Report of the Treasury Committee.

Council, 14th March, 1898.

Read the following letter:—

CHIEF SECRETARY’S OFFICE,
DUBLIN CASTLE, 11th March, 1898.

[4407.]

SIR,

With reference to your letter of the 7th instant, I am directed by the Lord Lieutenant to state that His Excellency observes that the Memorial from the Council of the Royal Irish Academy enclosed by you relates, in particular, to certain gold objects acquired by a Mr. Robert Day of Cork, which were found by a ploughman “near the sea on the north-west coast of Ireland.”

His Excellency would be glad if the Council could give him some more precise particulars, showing, if possible, the county in which the articles were found; the date of the finding; the name and address of

the finder; and how they came into the possession of Mr. Day, of Cork, before being acquired by the British Museum.

I am,

Sir,

Your obedient servant,

D. HARREL.

THE SECRETARY OF COUNCIL,
ROYAL IRISH ACADEMY,
19, Dawson Street.

The Secretary was authorized to reply to the above letter.

[REPLY.]

ROYAL IRISH ACADEMY,
19, DAWSON STREET, DUBLIN,
21st March, 1898.

SIR,

I duly laid before the Council of the Royal Irish Academy your letter (4407) relative to the Memorial forwarded to the Lord Lieutenant by the Council, referring to a collection of ancient gold objects found in the North of Ireland, and recently purchased by the British Museum, and was directed to state in reply, for His Excellency's information, that the Council greatly regret that they have no method of procedure at their disposal by which, in cases like the present, particulars such as are now desired could be ascertained. They can only, on hearing of any such matter, notify it to the authorities who represent the Crown (to whom the Treasure belongs), and who, by means of the Constabulary (who have permanent instructions regarding Treasure Trove) or other officers under the authority of the Executive, might be able to obtain information in a case like the present, the circumstances of which could hardly fail to have been known in the neighbourhood where these objects were found. Accordingly, when the Council heard of the matter, the attention of the Chief Crown Solicitor was called to it, in the hope that the Executive would have been able to ascertain the particulars now asked for.

As this expectation was disappointed, the Council had to wait for the publication of the Paper read before the Society of Antiquaries of

London,* in the hope that here at least, in the description of a find of such importance, full particulars would be given of the locality where found, the date and circumstances of the finding, &c. But when the Paper was published, the Council were astonished to see that all the information given on these points was that "the spot where the treasure was found is near the sea on the north-west coast of Ireland"; and further on in his Paper, the author says:—"The farmer on whose land the find was made, and with whom he is personally acquainted, is a shrewd hard-headed Presbyterian upon whose word Mr. Day could thoroughly rely, and who was most precise about the facts." It would seem, therefore, that all the author of the Paper knew about the circumstances of the find, was the report of Mr. Day, who was not the finder. And all further inquiry from the actual discoverer is at present precluded by the veil of silence that has been flung over the whole transaction, up to the date of the Paper.

It is obvious that this procedure must be very prejudicial to the interests of the Science of Archæology, because, as the matter stands, scholars can have no basis for theorizing on the origin and purpose of the Collection, save only what it has pleased Mr. Day to allow to be published, as they have no details as to the circumstances of the discovery, save the very meagre account given by Mr. Day to the author of the paper, Mr. Evans.

Mr. Day seems to have taken these treasure trove objects into his own custody, and to have carried on the negotiations for their sale, without paying any attention whatever to the regulations concerning treasure trove in Ireland, as to which, on a previous occasion (7th April, 1896), he had been carefully informed by the Council.

I am,

Sir,

Your obedient servant,

ROBERT ATKINSON,

Secretary of Council.

THE UNDER SECRETARY,
DUBLIN CASTLE.

* [NOTE.—*The Vol. of ARCHÆOLOGIA in which it is published was received at the Academy on 20th January, 1898.*]

Council, 18th April, 1898.

Read the following letters :—

MYRTLE HILL HOUSE,
CORK, *April 13, 1898.*

DEAR SIR,

To facilitate the transference of the Celtic gold ornaments from the British Museum to that of the Royal Irish Academy, I have written to the Chancellor of the Exchequer and enclose a copy, which favour me by placing before the Council at their next meeting.

I remain,

Yours most truly,

ROBERT DAY.

[ENCLOSURE.]

(COPY.)

MYRTLE HILL HOUSE,
CORK, *April 13, 1898.*

SIR,

During the past year the Trustees of the British Museum purchased from me for £600, some Celtic gold ornaments that were found in the North of Ireland. I believe it is your wish that I should write and inform you that I will repay the Trustees the above named amount if they transfer the ornaments to me, and that upon their doing so, I will hand them over to the Royal Irish Academy, who, in their turn, will reimburse me for them.

I have the honour to remain,

Sir,

Your obedient servant,

ROBERT DAY.

[Resolution of Council]:—"That copies of the letters now read be sent to the Lord Lieutenant with the expression of the earnest desire of the Council that the Government may facilitate the passing of an Act to enable the British Museum to let the gold articles be transferred to Ireland. The Council express no opinion as to the action of the British Museum, nor as to the price offered and paid by them."

19th April, 1898.

[Copy of above resolution and copies of Mr. Day's letters sent to the Lord Lieutenant. Receipt acknowledged by Assistant Under Secretary on 23rd April.]

Council, 21st November, 1898.

[The following letter directed to be forwarded to the Chief Secretary]:—

ROYAL IRISH ACADEMY,
November 22nd, 1898.

SIR,

Referring to the Memorial forwarded to His Excellency the Lord Lieutenant on the 7th March and other correspondence on the subject of the gold objects found in the North of Ireland, and subsequently bought by the British Museum from Mr. Robert Day, I have been directed by the Council to ask that his Excellency may be pleased to communicate to the Council such information as he may be able to afford as to any decision arrived at by Her Majesty's Government relative thereto.

The matter being one in which not merely the Council of the Academy, but the whole body of Irish Antiquaries, and a large section of the Irish public are keenly interested, the Council would feel indebted to His Excellency if he would favour them with some information thereupon.

I am,

Sir,

Your obedient servant,

ROBERT ATKINSON,

Secretary of Council.

THE CHIEF SECRETARY TO
THE LORD LIEUTENANT
DUBLIN CASTLE.

Council, 5th December, 1898.

Read the following letter :—

[19817.]

CHIEF SECRETARY'S OFFICE,

DUBLIN CASTLE, *November 28th, 1898.*

SIR,

I am directed by the Lord Lieutenant to acknowledge the receipt of your letter of the 22nd instant on the subject of certain gold ornaments found in Ireland and purchased by the British Museum, and I am to state for the information of the Council of the Royal Irish Academy that the Lords Commissioners of Her Majesty's Treasury have intimated to His Excellency that they have appointed a Committee composed as follows to inquire into the matter, and into the relations between the British Museum and those of Edinburgh and Dublin:—

Right Hon. Lord Rathmore (Chairman).

Right Hon. John Morley, M.P.

Right Hon. Sir John Lubbock, Bart., M.P.

Sir John Evans, K.C.B.

Right Hon. Sir Herbert Maxwell, Bart., M.P.

Sir Thomas Esmonde, Bart., M.P.

Mr. E. G. Harman, of the Treasury, has been appointed Secretary to the Committee, who will probably meet in the first week in December.

I am,

Sir,

Your obedient servant,

J. B. DOUGHERTY.

THE SECRETARY OF COUNCIL,

ROYAL IRISH ACADEMY,

19, DAWSON-STREET.

[A resolution was adopted that the Secretary of Council be directed to write to the Lord Lieutenant to ask for a copy of the Treasury Minute under which the Committee has been appointed.]

Council, Saturday, 10th December, 1898.

[Read letter from the Under Secretary enclosing copy of the Treasury Minute of 24th October, 1898, appointing Committee.]

The Treasury Minute is given in the Report of the Treasury Committee, page iii.

[Read the following telegram from Lord Rathmore]:—

O.H.M.S.

WHITEHALL.

TO SECRETARY ROYAL IRISH ACADEMY,
19, DAWSON-STREET.

Lord Rathmore desires me to inform you that Committee on Relations between British Museum and Scotch and Irish Museum will meet at House of Lords, Tuesday next, at two o'clock, and to invite Royal Irish Academy to send representative as witness at that meeting.

HEWBY,

Treasury.

(COLLEGE-GREEN, DUBLIN, DEC. 8th, '98.)

“The communications were considered, and it was resolved that the Secretary of Council be authorised to act as representative of the Royal Irish Academy at the House of Lords on the Committee, on Tuesday next, December 13th, 1898.”

Council, 16th January, 1899.

“The Secretary of Council reported that during the vacation he attended, as desired, before the Committee appointed by the Treasury to inquire into the matter of the Gold ornaments found in Ireland and recently purchased by the British Museum, and into the relations between the British Museum and those of Edinburgh and Dublin. The Committee held their inquiry at the House of Lords. The Secretary stated that he laid before the Committee the claims of the Royal Irish Academy relative to the Gold ornaments found recently in the North of Ireland and bought by the British Museum from Mr. Day.”

[NOTE.—*The Report of the Treasury Committee was ordered by the House of Commons to be printed, May 1st, 1899.*]

Council, 19th June, 1899.

Read recommendation from Pol. Lit. & Antiqq. Committee of 14th June, 1899 :—

“That it be a recommendation to the Council to communicate with the Irish Government on the subject of the Gold ornaments found in Ireland in 1896, acquired last year by the British Museum, with a view of urging that effect should be given to the last paragraph but two of the Report of the Committee of the Treasury, and that the objects may be transferred to the Academy’s Museum as soon as possible.”

“Resolved—That the following letter be forwarded to the Under-Secretary to the Lord Lieutenant, on behalf of the Council :—

ROYAL IRISH ACADEMY,
19, DAWSON-STREET, DUBLIN,
20th June, 1899.

SIR,

I am directed by the Council of the Royal Irish Academy to ask you to be so good as to lay before His Excellency the Lord Lieutenant the Council’s respectful request to be informed whether his Excellency is yet in a position to indicate the course which Her Majesty’s Government intend to take with respect to the Gold ornaments found in Ireland in 1896, and subsequently purchased by the British Museum.

His Excellency is aware that when the Council of the Academy first heard of the ‘find’ they took steps to call the immediate attention of the Chief Crown Solicitor to the matter, and then having done so refrained from further active interference at the time, not from apathy or indifference, but believing it to be the province, as it was in the power alone, of the Executive and Law Officers of the Crown to prosecute the necessary inquiries respecting the circumstances of the case, which, when ascertained, led the Law Officers to form the opinion that the objects were distinctly Treasure Trove.

The Committee subsequently appointed by the Treasury to inquire into the circumstances of these gold ornaments, and into the relations of the three National Museums of the Kingdom, with regard to the

acquisition and retention of objects of antiquarian and historic interest, say in the first paragraph of page vi of their report:—

“If, therefore, the hoard found near Limavady be Treasure Trove it ought, according to law, to have been delivered up to the Police or the Government of Ireland, and it would in that case, no doubt, have been handed over to the Academy to be kept under their charge in the National Museum of Ireland.”

Against this strong claim of right the only practical answer offered was that the British Museum was precluded by the Statutes, which govern that institution, from parting with such objects when once acquired; but the circumstances of the find, as disclosed in the evidence laid before the Committee would seem to show that the objects were wrongfully offered to the British Museum, in which case the disabling Statutes should not be made to apply.

The Committee of inquiry appointed by the Treasury did not express any opinion on this point, as they held that the terms of their Lordships' reference did not invite them to do so. They, however, recommend that the necessary steps should be taken for the purpose of relaxing, under special circumstances, the statutory provisions which prevent the British Museum from parting with objects which it has acquired.

The Council were glad to learn from the reply of the First Lord of the Treasury to Mr. P. O'Brien (for Mr. W. Redmond) that the Government were taking steps to carry out the recommendations of the Committee; but, as that reply was given in the House of Commons on the 12th of May, the Council would be grateful to His Excellency if he could intimate to them what further progress has been made in the matter.

I am,

Sir,

Your obedient servant,

ROBERT ATKINSON,

Secretary of Council.

THE UNDER SECRETARY,
DUBLIN CASTLE.

Council, November 6th, 1899.

Read the following letter :—

[11227]

CHIEF SECRETARY'S OFFICE,

DUBLIN CASTLE, June 22nd, 1899.

SIR,

I am directed by the Lords Justices to acknowledge the receipt of your letter of the 20th instant, conveying the request of the Council of the Royal Irish Academy to be informed of the course which Her Majesty's Government intend to take with respect to the gold ornaments found in Ireland in 1896 and subsequently purchased by the British Museum; and I am to say that the matter is still engaging the attention of Government, and that a decision will be announced as soon as possible.

I am,

Sir,

Your obedient servant,

J. B. DOUGHERTY.

THE SECRETARY OF COUNCIL,

ROYAL IRISH ACADEMY.

Council, December 3rd, 1900.

[Resolved that the following letter be forwarded] :—

ROYAL IRISH ACADEMY.

19, DAWSON STREET, DUBLIN,

5th December, 1900.

SIR,

Referring to previous correspondence relative to the gold ornaments found in the North of Ireland and to the answers given to questions on the subject in the House of Commons, indicating that an Inquisition would be held relative to the circumstances of their finding; and the subsequent answer, of the 6th August of the present year, of the Chief Secretary, to a question of Sir Thomas Esmonde, stating that:

“ It had recently been ascertained that the words of the patent of 10 Charles II., granted to the Irish Society for the Plantation of Ulster, are large enough to vest in this Society the right to Treasure Trove ”;

I am directed by the Council to request you to ascertain if His Excellency the Lord Lieutenant is in a position to notify any further progress in this matter, and, if so, to request that the Council might be furnished with information thereon.

I am,

Sir,

Your obedient servant,

ROBERT ATKINSON,

Secretary of Council.

THE UNDER SECRETARY,
DUBLIN CASTLE.

Council, 17th December, 1900.

Read the following letter :—

[22832]

CHIEF SECRETARY'S OFFICE,

DUBLIN CASTLE, *December 8th*, 1900.

SIR,

I am directed by the Lord Lieutenant to acknowledge the receipt of your letter of the 5th instant, and to state, for the information of the Council of the Royal Irish Academy, that the question of the Celtic gold ornaments is still under consideration, and that it is hoped that it will soon be possible to announce a decision.

I am,

Sir,

Your obedient servant,

J. B. DOUGHERTY.

THE SECRETARY OF COUNCIL,

ROYAL IRISH ACADEMY,

19, Dawson-street, Dublin.

Council, 21st January, 1901.

Read the following letter :—

DUBLIN CASTLE,

14th January, 1901.

DEAR SIR,

With reference to the official correspondence which has taken place on the subject of the Celtic gold ornaments found in the North

of Ireland, and purchased by the British Museum in 1897, the Chief Secretary desires me to request that you may be so good as to inform the Council of the Royal Irish Academy, that seeing that the Law Officers have advised that these ornaments were treasure trove, but that the right to this treasure trove is vested in the Fishmongers' Company, not in the Crown, he would suggest that it might be advisable if two or three members of the Council were to discuss the matter personally with him, with a view to determining what further action should be taken to endeavour to secure the return of these ornaments to Ireland.

Should the Council concur in this suggestion, the Chief Secretary will be happy to see its representatives here on Monday, the 28th instant, at 12 noon.

Yours truly,

L. C. DOWDALL.

ROBERT ATKINSON, Esq., LL.D.

Resolved that Mr. Garstin and the Secretary of Council be requested to meet the Chief Secretary in obedience to the request in the above letter.

Council, 4th February, 1901.

The Committee appointed to meet the Chief Secretary on the subject of the gold ornaments laid their report before the Council.

29th January, 1901.

[Conference of the Chief Secretary with the Secretary of Council and Mr. Garstin, representing the Council, relative to the gold objects found in the North of Ireland in 1897, and acquired by the British Museum.]

In accordance with the resolution of the Council, based on the letter of January 14, from the Chief Secretary, inviting them to appoint two or three members to discuss with him "what further action should be taken to endeavour to secure the return of these ornaments to Ireland," we attended, by appointment, at the Castle on Monday, the 28th of January, at twelve o'clock, and were very courteously received by Mr. Wyndham, in attendance on whom was

his secretary, Mr. Dowdall. Mr. Wyndham, who had evidently made a careful study of the case, and was furnished with all the important documents referring thereto, told us that he was fully aware of the proceedings in Parliament and of Mr. Balfour's action respecting the gold objects in question. He assured us that he was "warmly" desirous of their restoration to Ireland, and was clearly of opinion that it was desirable, apart from legal considerations, that they should find a place in our Museum (which he seemed well acquainted with), and he thought they could be more usefully studied there, along with kindred objects, than in the British Museum.

Nor had it escaped him that considerable importance was to be attached to the National sentiment. He informed us that—as we were aware—the law officers were of opinion that the gold objects were treasure trove; and, further, that the terms of the Charter of the Irish Society were by them held to be sufficient to convey these objects to that body. We pressed upon him Sir Edward Coke's definition of treasure trove, and the subsequent clause quoted in the Report of the Treasury Commission, as to the conveyance of treasure trove only by the establishment of an express grant of the franchise of treasure trove, and we urged that no such express grant appeared to us to be discoverable in the Charter of the Irish Society that we had examined.

He noted this, and promised to consult the Attorney-General upon it.

He expressed his intention of taking what seemed to him the most likely course to secure the return of the find. The particular steps he had in view he did not, at this stage, think it advisable to communicate to the Academy.

We asked him for copies of the law officers' opinions; but, though he quoted from them to us, he said they were regarded as private, and copies were not allowed out of the office.

It is obvious that we can only report the general nature of the discussion, which could not be other than tentative; but it seemed to us that the Chief Secretary was strongly in sympathy with the desire of the Academy to secure the presence of these valuable objects of antiquarian interest in the collection of the Royal Irish Academy, and we felt assured that he would not fail of giving his warm support to whatever measures might be finally deemed desirable to attain that end.

Council, 1st April, 1901.

“Mr. Garstin moved, and Mr. Westropp seconded, that the President be requested to ascertain from the Law Officers of the Crown what the claim of the Fishmongers’ Company to the gold ornaments found near Limavady being treasure trove is based upon.”

Passed.

9th April, 1901.

The following letter was forwarded:—

*Gold Ornaments found in
the North of Ireland.*

ROYAL IRISH ACADEMY,
19, DAWSON STREET,
DUBLIN, 9th April, 1901.

SIR,

The Council of the Royal Irish Academy have requested me to ascertain the precise words in the patent of Charles II. granted to the Irish Society for the Plantation of Ulster, which, Mr. G. W. Balfour stated in the House of Commons, on 6th August, 1900, had been ascertained to be sufficient, in the opinion of the Law Officers of the Crown, to convey the franchise of treasure trove to that Society; or the words, and the document in which they are contained, which conveyed it to the Fishmongers’ Company: as the Council can find no words in any document to which they have had access which appear to them in any way to grant or convey such franchise.

I shall therefore be very much obliged if you will furnish me with definite information which I can lay before the Council.

I am,

Sir,

Your obedient servant,

ROBERT ATKINSON,
President, Royal Irish Academy.

RIGHT. HON.

THE CHIEF SECRETARY, M.P.,
DUBLIN CASTLE.

Council, 20th May, 1901.

Read the following letter :—

No. 8775.

CHIEF SECRETARY'S OFFICE,
DUBLIN CASTLE,

10th May, 1901.

SIR,

With reference to your letter of the 9th ultimo asking for further information bearing on a statement made by the late Chief Secretary in the House of Commons, on the 6th August, on the question of the Celtic Gold Ornaments, I am directed by the Lord Lieutenant to acquaint you, for the information of the Council of the Royal Irish Academy, that the Law Officers' opinion on which the statement was based was that the general words in the Charters of James I. and Charles II. following the grant of lands beginning, "We have also granted and confirmed all and singular our messuages, mills," &c., &c., are capable of conveying to the Irish Society the Right of the Crown to treasure trove; and that the general words in the grant by the Irish Society to the Fishmongers' Company, of 24th October, 1618, commencing with "all and every rents, suits," &c., are sufficient to carry the same rights to the Fishmongers' Company.

The Law Officers have, however, since explained that, in using the words "capable of conveying," they did not imply that the question was beyond argument. It has been ascertained that the Fishmongers' Company are not prepared to move in the matter; and this being so it has again become a question for the Irish Government to consider, in communication with the Treasury, whether the Crown ought to move. In these circumstances it is hoped that the Royal Irish Academy will take no further action for the present. The final result of the further consideration would be communicated to the Council as soon as possible.

I am, Sir,

Your obedient servant,

D. HARREL.

THE PRESIDENT,

ROYAL IRISH ACADEMY.

Council, 3rd June, 1901.

[Report containing Minutes and Correspondence relative to the Gold Antiquities found near Limavady in 1896 laid before the Council, and ordered to be laid before the Academy at its next meeting.]

“Resolved—That the request of the Government contained in the letter of May 10th, 1901, from the Under-Secretary to the Lord Lieutenant, viz. that the Royal Irish Academy will take no further action for the present as regards the Gold Ornaments, shall be acceded to : and that the final result of the further consideration of the subject be awaited, the communication of which has been promised as soon as possible.”

The Report was adopted.

The following Grants in aid of Scientific Research, recommended by the Council, were approved :—

£25 to Dr. H. H. Dixon, to assist him in the accurate determination of the temperatures of the organs of plants.

£55 to a Committee, consisting of Dr. R. F. Scharff (Chairman), Capt. G. E. H. Barrett-Hamilton, Mr. N. Colgan, Prof. T. Johnson, Prof. E. J. McWeeney, Mr. F. W. Moore, Mr. A. B. Nichols, Mr. R. Patterson, Mr. G. Pim, Mr. R. L. Praeger, Mr. D. McArdle, Mr. G. H. Carpenter, and Mr. R. J. Usher, to enable them to carry on their researches into the Fauna and Flora of Ireland during the present year.

£10 to Mr. A. M'Henry, to assist him in the investigation of igneous and associated sedimentary rocks in the Ox Mountain range, which extends from near Castlebar, Co. Mayo, to Lough Gill, Co. Sligo ; and to investigate certain sedimentary and metamorphic rocks in Fanad, Co. Donegal.

£20 to a Committee, consisting of Prof. Cunningham, F.R.S., Prof. E. P. Wright, M.D., Prof. Haddon, F.R.S., and Dr. C. R. Browne, to assist them in carrying on the work of the Anthropometrical Laboratory, and the Ethnographical Survey of Ireland.

The Treasurer read, in accordance with By-Law 2, Chapter III., the list of Members in arrear.

MONDAY, JUNE 24, 1901.

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Professor D. J. Cunningham, F.R.S., read a Paper on—"The Parietal Lobe of the Brain in men of distinguished ability."

By permission of the Academy Mr. J. N. Halbert read a Paper by himself and the Rev. W. F. Johnson, M.A.—"A List of the Irish Beetles." (Being a Report from the Royal Irish Academy Fauna and Flora Committee.)

Donations to the Library were announced, and thanks voted to the Donors.

MONDAY, NOVEMBER 11, 1901.

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Mr. M. W. J. Fry, M.A., F.T.C.D., signed the Roll, and was admitted a Member of the Academy.

Prof. C. J. Joly, sc.D., F.T.C.D., read Papers entitled—

(a) "The Interpretation of a Quaternion as a Point Symbol."

(b) "Quaternion Arrays."

Mr. Frederick Purser, M.A., F.T.C.D., read a paper on—"The application of Bessel's Functions in the Theory of Elasticity."

Dr. W. J. O'Donovan exhibited and described a Map of the County of Wexford, between 1628 and 1644, presented by him to the Academy.

Mr. Coffey moved :—

"That a revision of the By-Laws is desirable for the purpose of simplifying the method and defining the conditions of the election of President and Council."

Dr. Browne seconded the motion, which was carried unanimously.

SATURDAY, NOVEMBER 30, 1901.

(STATED MEETING.)

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Mr. C. Litton Falkiner, M.A., read a Paper on—"The Irish Guards (1662-1795)."

Mr. C. Litton Falkiner, M.A., read also a "Note on an unpublished Diary, relative to the French Invasion in Mayo, 1798, presented by him to the Academy."

The thanks of the Academy were given to Mr. Falkiner for this Donation.

Other donations to the Library were announced, and thanks voted to the Donors.

The proposal Certificates of the following Candidates for Membership were read:—

Leonard Richard Fleming Strangways, M.A.

Most Rev. James Bennett Keene, D.D.

Samuel Dill, M.A.

Albert Edward Mettam, B.Sc.

David Comyn.

MONDAY, DECEMBER 9TH, 1901.

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Professor J. P. O'Reilly, C.E., read a Paper on—"The Waste of the Coast of Ireland."

Professor C. J. Joly, SC.D., F.T.C.D., read a Paper on—"Representation of Screws by Weighted Points and by Pairs of Weighted Points."

Donations to the Library were announced, and thanks voted to the Donors.

The Proposal Certificates of the following Candidates for Membership were read:—

John Isaac Beare, M.A., F.T.C.D.

Rev. Henry Kingsmill Moore, D.D.

MONDAY, JANUARY 13, 1902.

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Mr. George Coffey, A.I.B., made a communication relative to "A series of partially worked Pebbles from the 'Quarry Shop' sites of North America, illustrating the manufacture of Stone Implements."

Professor Johnson, D.Sc., read a Report by Mr. W. West, F.L.S., and Professor G. S. West, B.A., F.L.S.—“Contributions to the Fresh-water Algae of the North of Ireland” (being a Report from the Royal Irish Academy Fauna and Flora Committee).

Mr. Edward Gwynn, M.A., F.T.C.D., read the first Todd Memorial Lecture of the present series—*Subject*: “*Dindsenchas* of Sliab Bladma, Duibhind, and Liamain.”

MONDAY, JANUARY 27, 1902.

PROF. ROBERT ATKINSON, LL.D., LITT. D., President, in the Chair.

Rev. W. R. Westropp Roberts, B.D., F.T.C.D., read a paper on “Some Properties of a certain Quintic Curve.”

Mr. Edward Gwynn, M.A., F.T.C.D. read his second Todd Memorial Lecture of the present series.—*Subject*: “Poems from the *Dindsenchas* on Bairend Chermain, Dun Gabail, and Belach Durgein.”

The proposal Certificates of the following Candidates for Membership were read:—

Rev. Laurence O’Kieran.

Professor Wilbraham FitzJohn Trench, M.A.

MONDAY, FEBRUARY 10, 1902.

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Right Hon Mr. Justice Madden, LL.D., signed the Roll, and was admitted a member of the Academy.

Mr. Edward Gwynn, M.A., F.T.C.D. read his third Todd Memorial Lecture of the present series.—*Subject*: “Poems from the *Dindsenchas* on Dun Crimthaind, and other places.”

Professor G. A. J. Cole, F.G.S., exhibited a specimen of Telluride of Gold from Colorado, presented to the Academy by [Mr. Philip Argall, M.B.I.A., and moved that the thanks of the Academy be given to Mr. Argall; the motion was seconded by Professor O’Reilly, and passed.

A grant of £15, recommended by the Council to Professor Cole and Mr. J. A. Cunningham, in aid of researches on the Igneous Dykes and Metamorphic Rocks of N.W. Ireland, was approved.

Donations to the Library were announced, and thanks voted to the Donors.

The following By-Laws, recommended by the Council to be substituted for the existing By-Laws, Chapter IV., Nos. 4 to 6 inclusive, were brought up and considered :—

4. The same person shall not be elected President more than five times in succession.

5. The two Senior Members of the Committee of Science and of the Committee of Polite Literature and Antiquities, respectively, shall be removed from the Council immediately prior to the first Monday in March in each year; and their names, therefore, shall not be included in the list of forty-three names required by the Charter; but this rule shall not apply to any Member of either Committee who shall hold the office of Treasurer, Secretary of the Academy, Secretary of Council, or Librarian.

6. Such Members as shall be found to have attended less than fifteen meetings in all, of the Academy, Council, and either the Committee of Science or of Polite Literature and Antiquities, before the end of February in each year, shall also be removed from the Council immediately prior to the first Monday in March, and their names shall be omitted from the list of forty-three names required by the Charter.

Provided that if any Member of Council shall have been elected after the Stated Meeting in March he shall not be required to attend fifteen meetings in order to retain his place in the list, but only such proportion of the number of meetings since his election, as the Council shall judge to be equivalent thereto.

Provided also that the Council shall have power to accept six attendances instead of fifteen, from members ascertained and determined by the Council to be non-resident. The number of Members to whom this privilege may be given shall not exceed four.

7. The form and manner of the election of the President and Council is as follows :—

(a) On the first Monday in March of every year, the President and Council shall meet, and shall prepare a list of forty-three names (the names of the then subsisting President and Council being included).

(b) This list shall be divided into three Sections, the first containing the name of the subsisting President, the second consisting of twenty-two names, and the third of twenty names, being those of the then subsisting Committees of Science and of Polite Literature and Antiquities, and of such other persons as shall be deemed qualified to serve on these Committees, respectively.

In this list the number of meetings of the Council, of its stated Committees, and of the Academy, respectively attended by each Member, shall be printed, as well as the date of his election to the Council.

(c) The President for the expiring year, if retiring from the Chair in accordance with § 4, *supra*, shall be considered as eligible to one of the Committees of Council.

(d) The list of forty-three names, when prepared, shall be forthwith hung up in a public room of the Academy, and shall there remain until the day of election.

(e) A printed copy of the said list shall also be forwarded to each Member of the Academy, with his summons for the Stated Meeting, at which the election is to take place, out of which list of 43 names, the said Corporation shall elect a President and Council for the next ensuing year after such form and manner as the President and Council, with the approbation of the Academy, shall have ordained.

(f) In voting, each Member shall, in the printed list so provided, prefix the letter P to the name of such Member as he may desire to elect President, and an asterisk to the name of each Member whom he may desire to place upon the Council, but the

number of names marked with an asterisk must not exceed eleven for the Committee of Science and ten for the Committee of Polite Literature and Antiquities.

(g) In the scrutiny of the ballot the scrutineers shall reckon votes marked P for a member who is not elected President as votes for a place on the Committee on which he has already served.

In reply to a Member the President explained that under the proposed By-Law 5 of Chapter iv. the two Senior Members of the Committee of Science and also the two Senior Members of the Committee of Polite Literature and Antiquities were to be removed each year except in the case where any Member holding one of the offices named at the end of the section should be one of the two Senior Members of either of the Committees of Council, in which case the rule as to retirement should apply to the Member or Members not holding any of such offices who should be next in seniority.

The By-Laws were then approved and confirmed, the existing sections 7 and 8 to be henceforth numbered 8 and 9, respectively.

The Secretary read, in accordance with section 2, Chapter II., of the By-Laws, in alphabetical order, the names of all Candidates for Membership proposed subsequently to the Stated Meeting in March, 1901.

MONDAY, FEBRUARY 24, 1902.

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Professor Trouton, F.R.S., read for Professor W. Ramsay, F.R.S., HON. M.R.I.A., a Paper on—"The Surface Energy of Mixtures of certain Liquids."

Professor John Joly, F.R.S., read a Report on—"Solvent Denudation in Fresh and Salt Water."

Mr. Henry F. Berry, M.A., read—"Notes on an unpublished MS. Inquisition (A.D. 1258), relating to the Dublin City Watercourse, among the Muniments of the Earl of Meath."

Mr. Edward Gwynn, M.A., F.T.C.D., read his fourth Todd Memorial Lecture of the present series.—*Subject* : “Poems from the *Dindsenchas* of Loch Garman, and other places.”

Donations to the Library were announced, and thanks voted to the Donors.

In accordance with section 2, Chapter II., of the By-Laws, the President read, in alphabetical order, the names of the following Candidates for Membership recommended by the Council for election :—

John Isaac Beare, M.A., F.T.C.D.

David Comyn.

Samuel Dill, M.A.

Most Rev. James Bennett Keene, D.D.

Albert Edward Mettam, B.Sc.

Rev. Henry Kingsmill Moore, D.D.

Leonard Richard Fleming Strangways, M.A.

Wilbraham Fitz John Trench, M.A.

A communication from the Owen's College, Manchester, inviting the presence of a representative of the Academy on the occasion of the Jubilee of Owen's College, was read, and it was resolved that the President be nominated as the Academy's representative.

SATURDAY, MARCH 15, 1902.

(STATED MEETING).

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Minutes of last meeting read.

Mr. G. H. Kinahan objected to the Minutes being signed on the ground that a letter of his had not been read at the last meeting. The President ruled that the Minutes were a mere record of the acts of the Academy, and that therefore Mr. Kinahan was not in order in his remarks. On Mr. Kinahan continuing to speak, the Secretary moved and Mr. C. J. Joly seconded “that Mr. Kinahan be no longer heard.”

This being carried by 12 votes to 1, the Minutes were formally confirmed.

A ballot was opened for the election of President and Council. Mr. Garstin and Dr. Woolcombe were appointed Scrutineers.

A ballot was opened for the election of new Members and for the election of Honorary Members of the Academy.

Mr. C. J. Joly and Mr. C. Litton Falkiner were appointed Scrutineers.

The Secretary, in the absence of the Secretary of Council, read the following:—

REPORT OF THE COUNCIL FOR THE YEAR 1901-2.

Since the presentation of the last Report the Academy has received, through the Home Secretary, the King's thanks for the Address of condolence on the death of the late Queen and of congratulation on His Majesty's accession. The King has been pleased graciously to accede to the request of the Academy that he should assume the office of Patron held by his Royal Predecessors.

The Academy was represented by Professor Bernard, Secretary of the Academy, and Professor C. J. Joly, Royal Astronomer of Ireland, at the Celebration, in June, 1901, of the Ninth Jubilee of the University of Glasgow, and by the Secretary for Foreign Correspondence, Dr. Scharff, at the International Congress of Zoology at Berlin in August, and the President has, during the present week, attended the Jubilee Celebration of the Owens College, Manchester, as the representative of the Academy. Invitations were also received for delegates to the presentation of medals to M. Berthelot at the Sorbonne on 24th of November, and to M. Gaudry at the Muséum d'Histoire Naturelle, Paris, on the 9th of the present month; but, as it was found impracticable, at short notice, to send representatives, letters of congratulation were substituted.

The attention of the Council having been drawn to the recent establishment of a "British Academy," for which a Charter is sought from the King, and the matter having been referred by His Majesty to a Committee of the Lords of the Council, it was thought

necessary to present a Petition from the Council (12th February) praying that His Majesty might be pleased to cause an inquiry to be made with a view to insuring that the rights and privileges of the Royal Irish Academy might not be endangered by the incorporation under charter of an association bearing the title of "The British Academy for the Promoting of Historical, Philosophical, and Philological Studies."

During the past year the following papers have been read:—

IN SCIENCE.

Astronomy.

Rev. M. H. Close, M.A.—"Hipparchus and the Precession of the Equinoxes."

Botany.

Report from the *Fauna and Flora Committee* by W. West, F.L.S., and Prof. G. S. West, B.A., F.L.S.—"Contributions to the Freshwater Algae of the North of Ireland."

Geology.

Prof. John Joly, F.R.S.—"Solvent Denudation in Fresh and Salt Water."

Prof. J. P. O'Reilly, C.E.—"The waste of the Coast of Ireland"

Mathematics.

Prof. C. J. Joly, sc.D., F.T.C.D.—(1) "The interpretation of a Quaternion as a Point Symbol"; (2) "Quaternion arrays"; (3) "Representation of Screws by Weighted Points and by Pairs of Weighted Points."

Frederick Purser, M.A., F.T.C.D.—"The application of Bessel's Functions in the Theory of Elasticity."

Rev. W. R. Westropp Roberts, B.D., F.T.C.D.—"Some Properties of a certain Quintic Curve."

Physics.

Dr. F. T. Trouton, F.R.S.—"The Creeping of Liquids and the Surface Tension of Mixtures."

Prof. W. Ramsay, F.R.S., HON. M.B.I.A.—"The Surface Energy of Mixtures of certain Liquids."

Physiology.

Prof. D. J. Cunningham, F.R.S.—“The Parietal Lobe of the Brain in men of distinguished ability.”

Zoology.

Report from the *Fauna and Flora Committee* by Rev. W. F. Johnson, M.A., and J. N. Halbert.—“A List of Irish Beetles.”

IN POLITE LITERATURE AND ANTIQUITIES.

Archæology.

Rev. M. H. Close, M.A.—“Remarks on a Cosmographical Tractate of the Fourteenth Century in the Irish Language, in the Library of the Academy.”

George Coffey, A.I.B.—A *Note* “On a Series of partially worked Pebbles from the ‘Quarry-shop’ sites of North America, illustrating the manufacture of Stone Implements.”

Professor J. P. O’Reilly, C.E.—“The mode of Ringing or Sounding Bells in the early Churches of Northern Spain and of Ireland.”

Thomas J. Westropp, M.A.—(1) “The Ancient Forts of Ireland, their plans and structural features.” (2) “Dolmens and Pillar Stones in the Baronies of Bunratty, Co. Clare.”

History.

Henry F. Berry, M.A.—“Notes on an unpublished MS. Inquisition (A.D. 1258), relating to the Dublin City Watercourse, among the Muniments of the Earl of Meath.”

C. Litton Falkiner, M.A.—(1) “The Irish Guards (1662–1795)”; (2) “The Phoenix Park, its origin, formation and early history; with some notices of its Royal and Viceregal residences”; (3) and a *Note* “On an Unpublished Diary, relative to the French Invasion in Mayo, 1798, presented by him to the Academy.”

Professor Edward J. Gwynn, M.A., F.T.C.D., delivered the Todd Memorial Lectures on “Poems from the *Dindsenchas*.” Professor

Gwynn reports that he hopes to publish another instalment of the *Dindsenchas* Poems in a couple of months; the text and translation for this have long been in type, but the commentary was unavoidably delayed by the necessity of preparing the course of lectures just completed. After the publication of this second volume, Professor Gwynn considers that it will be best to postpone further printing until he shall have time to collate and translate the entire series of poems. The whole number of lines probably exceeds 10,000; and there are many questions as to the text and the date of the poems, etc., which cannot be treated adequately until the collection has been studied as a whole, and such study he has found to be impossible whilst his time was largely occupied by the process of correcting the proof-sheets of the instalment now being printed. With the permission of the Council, therefore, Professor Gwynn will not attempt to publish anything beyond the volume now at Press until he has completed his preparations for editing the entire collection.

Since the date of the last Report the following Publications of the Academy have been issued :—

Transactions, vol. xxxi.

Part 11.—“On Metamorphic Rocks in Eastern Tyrone and Southern Donegal.” By Grenville A. J. Cole, F.R.S.

Part 12.—“Further Developments of the Geometrical Theory of Six Screws.” By Sir Robert S. Ball, LL.D., F.R.S.

Part 13.—“Notes on the High Crosses of Moone, Drumcliff, Termonfechin, and Killamery.” By the late Margaret Stokes, Hon. M.R.I.A. Edited by T. J. Westropp, M.A.

And

Part 14.—“The Ancient Forts of Ireland: being a contribution towards our knowledge of their types, affinities, and structural features.” By Thomas Johnson Westropp, M.A.

will be laid on the table to-day, with which Part, Vol. xxxi. is now complete.

Proceedings.

Of the *Proceedings*, Third Series, Vol. vi., Parts 2 and 3 were published in January and October, respectively, containing Papers on various branches of Science, by Prof. W. H. Thompson, M.D.; Prof. Alex. Macfarlane, D.Sc.; Mr. D. McArdle, Rev. M. H. Close, M.A.; C. R. Browne, M.D.: in Literature, by Prof. L. C. Purser, Litt.D.; Prof. H. J. Lawlor, D.D.; Prof. S. P. Johnston, M.A.; and in Archæology and History, by Rev. G. R. Buick, LL.D.; Prof. J. Rhys, M.A.; Prof. E. P. Wright, M.D.; W. J. Knowles, T. J. Westropp, M.A.; Prof. J. P. O'Reilly, C.E.; and C. Litton Falkiner, M.A.; and of the same series, Vol. vii., devoted exclusively to a Monograph, by Mr. R. Lloyd Praeger, B.E., on "Irish Topographical Botany," was published in July.

The following *Grants* in aid of Scientific Research were recommended by the Council:—

£25 to Dr. H. H. Dixon, to assist him in the accurate determination of the temperatures of the organs of plants.

£55 to a Committee, consisting of Dr. R. F. Scharff (Chairman), Capt. G. E. H. Barrett-Hamilton, Mr. N. Colgan, Prof. T. Johnson, Prof. E. J. McWeeney, Mr. F. W. Moore, Mr. A. R. Nichols, Mr. R. Patterson, Mr. G. Pim, Mr. R. L. Praeger, Mr. D. McArdle, Mr. G. H. Carpenter, and Mr. R. J. Ussher, to enable them to carry on their researches into the Fauna and Flora of Ireland during the present year.

£10 to Mr. A. M'Henry, to assist him in the investigation of igneous and associated sedimentary rocks in the Ox Mountain Range, which extends from near Castlebar, Co. Mayo, to Lough Gill, Co. Sligo; and to investigate certain sedimentary and metamorphic rocks in Fanad, Co. Donegal.

£20 to a Committee, consisting of Prof. Cunningham, F.R.S.; Prof. E. P. Wright, M.D.; Prof. Haddon, F.R.S.; and Dr. C. R. Browne, to assist them in carrying on the work of the Anthropometrical Laboratory, and the Ethnographical Survey of Ireland.

£20 to Mr. W. J. Knowles, and Mr. G. Coffey, to assist them in the exploration of a crannog in the County of Antrim.

£15 to Prof. Cole and Mr. J. A. Cunningham, in aid of Researches on the Igneous Dykes and Metamorphic Rocks of N.W. Ireland.

The entire text of the Book of Armagh is now in type, reproduced page for page from the MS. The number of pages is 440, occupying 55 quarto sheets. Of these sheets 49 (containing the whole New Testament, and the Life, &c., of St. Martin) are finally printed off: six only (containing the documents relating to St. Patrick) are still under revision. The Editor is engaged in preparing the Introduction and Appendices, in which he will include as much as is available of the matter (some of it still in manuscript) left by the late Bishop Reeves.

On the 27th of March of last year a joint meeting of the Royal Irish Academy and the Royal Dublin Society was held, under the presidency of Lord Rosse, to receive a preliminary report of the observations made by the members of the Solar Eclipse Expedition organised by the two Societies. The full details will be published in due time by both Societies.

The slips of the *Irish Dictionary* have made substantial progress under the direction of the Editor, the collection of those from the Facsimiles being now almost complete.

At the Stated Meeting on the 16th March, 1901, the following Members were elected:—

Matthew Wyatt Joseph Fry, M.A., F.T.C.D.,
 Right Hon. Dodgson Hamilton Madden, P.C., LL.D.,
 Edmond Joseph McWeeney, M.A., M.D.,
 Robert Patterson, F.Z.S.,
 Rev. William Ralph Westropp Roberts, M.A., B.D., F.T.C.D. ;

and the following were elected Honorary Members in the Section of Science:—

Felix Klein,
 Hermann Karl Vogel.

The Academy has lost by death within the year seven members:—

Hamilton Bell, elected May 12, 1884.

Rt. Hon. Col. Edward Henry Cooper, M.M.L., elected April 9, 1866.

Thomas Dunbar Ingram, LL.D., elected April 14, 1879.

James Fitzgerald Lombard, elected April 12, 1875.

John Christian Malet, M.A., F.R.S., elected February 9, 1874.

Charles Joseph O'Donel, elected January 14, 1867.

Brian O'Looney, elected April 10, 1871.

By the death of John Christian Malet the Academy has lost one of its most accomplished Mathematicians. Mr. Malet was a son of the late Rev. John Adam Malet, Senior Fellow and Librarian of Trinity College, Dublin, in which College he himself also had a most distinguished undergraduate course, which he completed in 1869 by obtaining the first Senior Moderatorship and University Studentship in Mathematics.

His first paper contributed to the Academy was in 1874, on "Some Theorems in the Reduction of Hyper-Elliptic Integrals," and in the same year a further paper was read by him on "Certain Symmetric Functions of an Algebraic Equation," both of which are published in the *Transactions*, vol. xxv. In 1878 he read three papers "Direct Demonstration of the Properties of the First Negative Pedal of a Central Conic from any point in its plane": "On a Proof that every Algebraic Equation has a Root," and "On a Certain Surface derived from a Quadric," all of which are in vol. xxvi. of the *Transactions*. In 1882 there was also published, in the *Transactions*, a paper by him on "Certain Definite Integrals," and in that year he was elected a Fellow of the Royal Society. In 1885 the Academy conferred upon him the Cunningham Gold Medal for his researches in Elliptic Functions. The remaining papers by him, published by the Academy, were "Geometrical Theorems," in the *Transactions*, 1886; and in 1882, a paper, in the *Proceedings*, "'On the Equation of a Tangent Cone to a Quadric referred to the Axes.'" In 1880 he was appointed Professor of Mathematics in the Queen's College, Cork, and became a Fellow of the Royal University of Ireland in 1882. In 1887 he was appointed an Assistant Commissioner of Intermediate Education, which office he still held at the time of his comparatively early death.

The Academy has also lost by death three Honorary Members in the Section of Science:—

Aleksandr Onufrijevič Kovalevskij, elected 16th March, 1900,

Baron Adolf Eric de Nordenskjöld, elected 16th March, 1884,

Peter Guthrie Tait, elected 16th March, 1900;

and three in the Section of Polite Literature and Antiquities:—

Samuel Rawson Gardiner, elected 16th March, 1895.

Emil Hübner, elected 16th March, 1898,

Right Rev. William Stubbs, elected 16th March, 1876.

The annual visitation of the Museum was held on 6th March, 1902. The principal changes in arrangement are the bringing together of groups of Antiquities found in the same place, the arrangement of the gold ornaments on velvet, and the separation and re-arrangement of the copper weapons.

It is proposed in future to incorporate in the Annual Report a brief Register of the additions made to the collections of the Royal Irish Academy (deposited in the Museum of the National Science and Art Institutions), the increase and study of which forms a very important branch of the Academy's work. The Register drawn up by the Curator, Mr. G. Coffey, includes the whole of the additions made in 1901, this arrangement being more convenient than that of the official year extending from March 1901 to March 1902.

REG. NOS. *Additions to the Royal Irish Academy's Collections for 1901.*

1901

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1-11

Antiquities in old collections not identified with previous register numbers.

12-40

A collection of objects from the crannog of Glassmullagh, near Enniskillen, Co. Fermanagh (Ordnance Sheet 27), consisting of fragments of pottery, whetstones, polishers, and stone disc, a small stone celt, a fragment of stone ring or armlet, a bone comb, bronze harp-pins, an iron knife, an iron axe-head, &c. Presented by Thomas Plunkett, M.R.I.A.

41

A bronze dagger in its original horn handle; found in a bog near Ballymoney, Co. Antrim. This is a very interesting specimen, and one of the most perfect examples of a hafted dagger of the Bronze Age. The dagger was of the usual triangular form with three rivets at the base. The greater part of the blade at both sides of the mid-rib has been corroded, but the full breadth of the blade remains in the part covered by the hafting. The handle is formed in

two parts. The grip and expanded portion to take the rivets are in one piece, shaped out of a single piece of horn, and notched transversely to receive the blade. The pommel is a separate piece, attached to the grip by a tenon and mortise joint, the tenon in the grip and the mortise in the pommel, the whole secured by two pins of horn or wood. Length of handle and blade, $9\frac{1}{2}$ inches.

2 A highly polished thin celt of green translucent stone, resembling Jadite, $7\frac{3}{4}$ inches by $3\frac{1}{2}$. Found near Rath of Paslickstown, Moylisca, Co. Westmeath. This makes the third specimen of this rare class of celts in the collection.

13 A stone celt in its original wooden handle. This important specimen was found in a bog near Maguire's Bridge, Co. Fermanagh. It is one of the best preserved specimens of stone-axe hafting which has been found in Europe, and forms a valuable addition to the collection. The wood resembles arbutus, but has not been definitely determined.

44 A finely polished perforated stone hammer of a handsome green stone; type R. I. A. Catalogue, fig. 63. Found in the Co. Fermanagh.

45 A bronze spear-head of unusual form. The socket is octagonal and the blade and socket are decorated with concentric circle and rectangular ornaments; there are four openings in the blade. Found near Boho, Co. Fermanagh. It is described and illustrated in *The Reliquary and Illustrated Archaeologist*, April, 1898.

46 Shrine known as the Lough Erne Shrine. This shrine was deposited in our collection, on loan, in 1891, and has now been acquired permanently. (Nos. 43 to 46 were purchased from Mr. Thomas Plunkett, M.R.I.A.).

-51 A socketed celt ($3\frac{3}{4}$ ins. by $2\frac{1}{4}$), large ring ($4\frac{3}{4}$ ins. diam.), two rings with lateral openings (type R. I. A. Catalogue, fig. 494, $1\frac{3}{4}$ ins. by $1\frac{1}{4}$), and a small ring ($1\frac{1}{4}$ diam.), all of bronze. Found together near Glenstal, Co. Limerick. This interesting group of associated objects is an important addition to the "finds" in the collection. It is from finds of associated objects, such as this, that the chronology of the Prehistoric Periods is to be worked out.

- 52 A stone celt (shale) found at Newgrove, Whitechurch, Co. Cork. This is the first specimen obtained from the Co. Cork. From Mr. Robert Day's collection.
- 53 Fragments of a large cinerary urn. Presented by H. L. Glasgow, Esq., Cookstown. The urn was found inverted (covering cremated human remains) on a flat stone in a sandpit at Tullyweggan, near Cookstown, Co. Tyrone. The fragments were obtained from the finder by Mr. Glasgow, who generously presented them to the Museum. They have been put together, and the urn has been restored.
- 54-69 Antiquities from the Kilkenny Museum, deposited by the Royal Society of Antiquaries of Ireland. See Proceedings R. I. A., Vol. vi., p. 283.
- 70 Seventy-eight stone disc-shaped beads (probably Neolithic) found in a bog near Westport, Co. Mayo.
- 71 A large cast bronze vessel standing on three legs, remarkable for castings in relief of a cross and a swastika on opposite sides. From the Co. Clare.
- 72 A wooden object of uncertain use.
- 73 A ball, lead covered with copper, and ornamented in an archaic manner.

The preceding Register does not include the objects found in the crannog in the bog of Craigyarren, Co. Antrim, some four miles from Ballymena, for the exploration of which a grant was made by the Council to Mr. W. J. Knowles and Mr. G. Coffey in the summer of 1901. These objects are now being examined, and when finally classified will be included in the Register for 1902. Meanwhile it may be stated that the work of excavation was carried out from August 28th to September 8th, 1901; the timbers were laid bare, and a survey and plan made of the site, and photographs taken. "The finds," as Mr. Coffey provisionally reports, "include a fine iron sword-blade, bill-hooks, chisel of early form, angur, bronze brooch and a pin, bronze bracelet, crucibles, pottery, and fragments of leather shoes (some decorated with trumpet-patterns); as well as a large collection of bones, including some good horse skulls, which have been placed in Dr. Scharff's hands for report. The finds are very consistent and indicate the period between 8th and 10th centuries."

Although a complete description is reserved for the Annual Report of next year, it may be permitted briefly to refer to the important purchase recently made of a canoe found last summer in a bog at Lurgan near Tuam, Co. Galway. It measures 52 feet in length, and its broadest beam is 4 feet. "Its condition," says Mr. Coffey, "is very good for an object of this class, and it is probably the finest specimen that has been found in Ireland." Its removal to the Museum was a work of unusual difficulty, but it is satisfactory to be able to state that it was accomplished without cutting or in any way injuring the canoe.

The Council regrets that the question as to the custody of the gold ornaments found in 1896 near Limavady, has not yet been determined. In accordance with a resolution of the Academy, passed on 22nd April, 1901, the Council prepared, and presented on 10th June, a full report of the steps that it had taken up to that date with a view to securing the return of these antiquities to Ireland. Since the presentation of that report the Council was informed by a letter of 14th June, from Sir D. Harrel, that "the matter has been referred to the Law Officers of England and Ireland, in consultation, to consider whether any, and, if so, what proceedings should be taken to determine the question in dispute." An inquiry on the part of the Council, by a letter of the Secretary of Council on 6th November, as to what steps had been taken since the last communication, elicited the reply from Sir D. Harrel on 3rd December, that—"The Treasury report that legal proceedings are now pending, with a view to the question being legally determined, whether the articles in question are Treasure Trove," and that "the Treasury have been asked to hasten the proceedings as much as possible." On 5th February the Secretary of Council wrote to Lord Desart, the Solicitor of the Treasury, who has charge of the suit against the British Museum, informing him that "the Academy will be ready to furnish him with any information" in their possession which he may desire; and received a reply, dated 6th February, conveying Lord Desart's thanks for "offer of assistance, of which I shall gladly avail myself should occasion arise."

A further revision of the Academy's by-laws, "for simplifying the method and defining the conditions of the election of President and Council," having been recommended by a motion of 11th November,

1901 (adjourned from 13th May and 10th June), the matter was referred by the Council, 18th November, to a committee of officers for report, which report, after consideration by the officers between November and 27th January, 1902, was laid before the Council on 3rd February and adopted. The new by-laws were adopted and confirmed by the Academy at its meeting of 10th February, 1902.

The Very Rev. J. H. Bernard, D.D., has resigned the office of Secretary of the Academy on his appointment to the Deanery of St. Patrick's; and Professor Stanley Lane Poole, Litt.D., has also resigned the office of Secretary of Council, since he finds that his residence at a distance in the country renders it almost impossible for him to carry out as he would wish the duties of the post.

The Report was adopted unanimously.

The Secretary moved, and Mr. C. J. Joly seconded, that By-Law 6, Chap. IX., be suspended, to permit Mr. Robert Lloyd Praeger, B.E., to read the following Papers:—(1) "On Types of Distribution in the Irish Flora"; (2) "Gleanings in Irish Topographical Botany."

Donations to the Library were announced, and thanks voted to the Donors.

On the Report of the Scrutineers the following were declared duly elected Members of the Academy:—

John Isaac Beare, M.A., F.T.C.D.

David Comyn.

Samuel Dill, M.A.

Most Rev. James Bennett Keene, D.D.

Albert Edward Mettam, B.Sc.

Rev. Henry Kingsmill Moore, D.D.

Leonard Richard Fleming Strangways, M.A.

Wilbraham Fitz John Trench, M.A.

And the following Honorary Members in the Section of Science:—

John Gilbert Baker.

Samuel Pierpont Langley.

And in the Section of Polite Literature and Antiquities :—

Friedrich Delitzsch.
Rodolfo Lanciani.
Ulrich von Wilamowitz-Möllendorff.
Salomon Reinach.
Heinrich Zimmer.

Mr. John Gilbert Baker, being present, signed the Roll, and was formally admitted an Honorary Member of the Academy.

The result of the ballot for President and Council were reported. Four names received the same number of votes for the last place on the Committee of Science. It was proposed and seconded that the President should exercise his casting vote. This was carried, and then the President, having voted, the result was declared as follows :—

PRESIDENT :

ROBERT ATKINSON, LL.D., LITT.D.

Committee of Science :

Greenwood Pim, M.A.
Grenville A. J. Cole, F.G.S.
Charles J. Joly, M.A.
Frederick W. Moore, F.L.S.
Frederick T. Trouton, D.SC., F.R.S.
Joseph P. O'Reilly, C.E.
Francis A. Tarleton, LL.D., D.SC.
Charles R. Browne, M.D.
Daniel J. Cunningham, M.D., F.R.S.
Thomas Johnson, D.SC.
Rev. W. R. Westropp Roberts, B.D.

Committee of Polite Literature and Antiquities.

Rev. Maxwell H. Close, M.A.	Stanley Lane-Poole, LITT.D.
Very Rev. H. J. Bernard, D.D.	Louis C. Purser, M.A., LITT.D.
Thomas J. Westropp, M.A.	Most Rev. Bishop Donnelly, D.D.
Rev. Edmund Hogan, S.J., D.LITT.	C. Litton Falkiner, M.A.
Robert Cochrane, F.S.A.	James Mills.

A ballot was opened for the election of officers. Mr. Falkiner and Mr. Cochrane were appointed as Scrutineers.

The President appointed under his hand and seal the following as Vice-Presidents for 1902-3 :—

Francis A. Tarleton, LL.D., S.F.T.C.D.

Joseph P. O'Reilly, C.E.

Most Rev. Bishop Donnelly, D.D.

Very Rev. Dean Bernard, D.D.

On the report of the Scrutineers, the result of the ballot for Officers was declared as follows :—

TREASURER—Rev. H. M. Close, M.A.

SECRETARY—Charles J. Joly, SC.D.

SECRETARY OF THE COUNCIL—Louis C. Purser, LITT.D.

SECRETARY OF FOREIGN CORRESPONDENCE.—Joseph P. O'Reilly, C.E.

LIBRARIAN—Grenville A. J. Cole, F.G.S.

ASSISTANT SECRETARY—Robert Macalister, LL.B.

The Academy then adjourned.

MONDAY, APRIL 14, 1902.

PROFESSOR ROBERT ATKINSON, LL.D., LITT.D., President in the Chair.

Mr. Leonard R. F. Strangways, M.A., Rev. H. Kingsmill Moore, D.D., Mr. David Comyn, and Mr. John I. Beare, M.A., F.T.C.D., signed the Roll, and were admitted Members of the Academy.

Mr. Thomas J. Westropp, M.A., read a Paper on "Dolmens and Pillar Stones in the Baronies of Bunratty, Co. Clare."

The Secretary read, for Miss M. A. Murray, a Paper on "The Egyptian Scarabs in the Dublin Museum." [Communicated by Colonel G. T. Plunkett, C.B.]

Professor J. P. O'Reilly, c.e., read a Paper on "The origin of certain Ancient Irish Water Mills."

Donations to the Library were announced, and thanks voted to the Donors.

Read the following letters :—

" 3, CUMBERLAND-ROAD, KEW,

" *March* 20, 1902.

" DEAR DR. JOLY,

" I have this morning received both your kind letter and my certificate of Membership of the Royal Irish Academy. I feel very grateful to the Council and Members of the Academy for the honour they have conferred upon me.

" Yours very truly,

" J. G. BAKER."

" CHÂTEAU DE ST. GERMAIN-EN-LAYE,

" *March* 20, 1902.

" DEAR SIR,

" I am under deep obligation to the Royal Irish Academy for the honour bestowed upon me by that learned body in the meeting of *March* 15th.

" Some of your colleagues are aware of the great interest which I feel for Irish antiquities and of the hope which I still entertain that an Irish Exploration Fund may some day be started and appeal to international liberality in view of systematic excavations.

" Please forward my most sincere thanks to the President of the Academy, and believe me,

" Dear Sir,

" Faithfully yours,

" SALOMON REINACH.

" *Member of the French Academy of Inscriptions and Polite Literature, Keeper of the National Museum.*"

“ REGIA UNIVERSITÀ DEGLI STUDI, ROMA,

“ *March 27, 1902.*

“ C. J. JOLY, Esq.,

“ Secretary of the Royal Irish Academy, Dublin.

“ DEAR SIR,

“ I beg to apologise for the delay in acknowledging the receipt of your most kind letter of March 18, informing me of my election to an Honorary Membership in the Section of Polite Literature and Antiquities of the Royal Irish Academy of Dublin.

“ I happened to be away from home at the time, and it was only yesterday morning that I found waiting for me your welcome letter and the Diploma of Membership.

“ Will you please express my deep gratitude to the President and to the Members of the Section for the great honour which they have been pleased to confer on me and which I fully appreciate.

“ I hope to bring out before the end of April, the first of the five volumes of my “ *Storia degli scavi e dei Musei di Roma,*” and I shall be very happy to offer the first copy to the Royal Irish Academy.

“ Believe me,

“ Dear Sir,

“ Your obedient servant,

“ PROFESSOR RODOLFO LANCIANI.

“ 2, VIA GOITO, ROME.”

WESTEND (BERLIN),

8. *April*, 1902.

AN DIE ROYAL IRISH ACADEMY,
DUBLIN.

Heimkehrend von einer Erholungsreise finde ich das Diplom vor, durch welches Sie mich zu Ihrem Ehrenmitgliede erwählen, und ein freundliches Schreiben Ihres Secretares, das, mich von dieser Wahl vorher in Kenntnis setzen sollte.

Leider hat meine Abwesenheit mir den Schein der Undankbarkeit zugezogen, da ich erst heute antworten kann.

Mir ist es aber wol bewusst, dass mir so die höchstte Ehre erwiesen ist, die mir das Leben gebracht hat, und dem entspricht die Tiefe meiner dankbaren Erkenntlichkeit. Es sind die ptolemaeischen Papyri, welche in Ihren Abhandlungen so rasch und so geschickt verarbeitet erschienen, gewesen, die mich zuerst zu intensiver Beschäftigung mit dieser Literatur angeregt haben. Der Zufall fügte es, dass ich gleichzeitig an der Spitze der Göttinger Universität stand, und so konnte ich die würdige Vertretung derselben durch Deputation und Gedicht bei dem Jubiläum der Ihnen verbundenen Universität in die Wege leiten. Das folgende Jahrzehnt hat manche Berührung gebracht, die Beziehungen der Akademien werden immer engere: in Jahresfrist hoffe ich Ihnen durch Teilnahme an der Erschliessung neuer Papyrus Schätze zeigen zu können, dass ich der Anregung zu folgen weiss, die ich einst von Dublin empfieng.

So ist es eine wirkliche innere Verbindung, der Sie in einer für mich so schmeichelhaften Weise Ausdruck gegeben haben: seien Sie meiner stetigen Dankbarkeit eben so versichert wie dass ich mich zeitlebens bestreben werde der Ehre würdig zu bleiben oder zu werden.

In Ehrfurcht und Dankbarkeit,

ULRICH VON WILAMOWITZ-MÖLLENDORFF.

Read the following:—

“TO THE PRESIDENT OF THE ROYAL IRISH ACADEMY.

“UNIVERSITAS OXONIENSIS,

“MDCCCCLII.

“In honorem THOMAE BODLEY,

Bibliothecae Bodleianae Fundatoris.

“Exactis iam CCC annis ex quo bibliothecam Academiae Oxoniensis saevitia temporum tum funditus direptam Thomas Bodley instauravit placuit mihi universoque coetui Academicorum et natalicia bibliothecae frequentare et memoriam Fundatoris pia observantia recordari. Quam bibliothecam cum ille non nobis solum sed et toti reipublicae litteratorum posuerit, te, vir honoratissime, rogamus ut

unum e societate tua eligas, qui ad dies 8 et 9 mensis Octobris tanti beneficii commemorationi intersit.

"Si, igitur, quod speramus, votis nostris satisfacere vis, nomen eius quem elegeris magistro Arturo Cowley renunties precamur.

"DAVID B. MONRO,

"*Vice-Cancellarius.*"

The Secretary proposed and Prof. O'Reilly seconded that the President should be requested to act as Delegate.

This was put to the Academy and passed.

MONDAY, APRIL 28, 1902.

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Prof. C. J. Joly, sc.D., F.T.C.D., read a Paper on "A new Quaternion Proof of Stokes's, Green's, and Allied Theorems."

Read the following letter:—

"SMITHSONIAN INSTITUTION, WASHINGTON,

"April 8th, 1902.

"Mr. Samuel Pierpont Langley has the honor to acknowledge the receipt of the announcement of his election as an Honorary Member of the Section of Science of the Royal Irish Academy of Dublin.

"Mr. Langley begs leave to convey to the Academy an expression of his high appreciation of this action on his behalf and of his gratification in accepting the honour thus shown him.

"THE ROYAL IRISH ACADEMY,

"19, DAWSON-STREET, DUBLIN, IRELAND.

"Through CHARLES J. JOLY, Esq."

Prof. T. Johnson, D.Sc., exhibited Specimens from Co. Kilkenny illustrative of Larch Canker due to *Peziza Willkommii*.

Read the following recommendation from Council :—

The Council recommend the Academy to lend the Mace, after the conclusion of the Session, to the Department of Agriculture and Technical Instruction for Ireland, for exhibition in the Historic Loan Collection, Cork Exhibition, 1902, subject to the conditions relative to protection from destruction or injury set forth in the letter of application, and to the condition of having it returned to the Academy at any time that it shall be demanded by the Treasurer.

The Recommendation was approved by the Academy.

Donations were announced and thanks voted to the Donors.

MONDAY, MAY 12, 1902.

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Prof. Stanley Lane-Poole, LITT.D., read a Paper on "An early Arabic Inscription from Rhodesia."

Donations were announced and thanks voted to the Donors.

Read the following letter :—

"BERLIN, W. 15. LUDWIGSKIRCHSTRASSE, 2,
"den 30. April, 1902.

"SEHR GEEHRTER HERR,

"Ich bestätige hiermit den Empfang des Diploms als Honorary Member of the R.I.A. Zugleich bitte ich Sie, der Royal Irish Academy meinen aufrichtigen Dank auszusprechen für die mir durch die Wahl erwiesene Ehrung: dieselbe wird mir ein weiterer Ansporn sein meine Kräfte ganz im Dienste der Wissenschaft zu verwenden.

"Ich verbleibe mit vorzüglicher Hochachtung

"Ihr ergebener,

"DR. H. ZIMMER.

"HERRN C. J. JOLY,

"Secretary of the R.I.A."

MONDAY, MAY 26, 1902.

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Prof. G. A. J. Cole, F.G.S., read a Paper on "Composite Gneisses in Boylogh, West Donegal.

Donations to the Library were announced and thanks voted to the Donors.

The Treasurer read the List of Members in arrear.

MONDAY, JUNE 9, 1902.

PROF. ROBERT ATKINSON, LL.D., LITT.D., President, in the Chair.

Rev. H. J. Lawlor, D.D., read a Paper on "The Manuscripts of the *Vita S. Columbani* of Jonas."

Mr. C. Litton Falkiner, M.A., read a Paper on "Two MS. Volumes, recently acquired by the Academy, relating to the Commercial Development of the City of Dublin in the Eighteenth Century."

Rev. M. H. Close, M.A., read a Paper on "A Seal with a Legend in the Old-Hebrew Script, found near Dundrum, Co. Dublin."

The following Grants in aid of Scientific Research recommended by the Council were approved by the Academy:—

£20 to Prof. John Joly, F.R.S., to assist him in the continuation of his Investigations on Rock Solutions in Salt and Fresh Water, especially on the influence of Rock Solution on Sedimentation.

£80 to a Committee, consisting of Dr. R. F. Scharff (Chairman), Capt. G. E. H. Barrett-Hamilton, Mr. N. Colgan, Prof. T. Johnson, Prof. E. J. McWeeney, Mr. F. W. Moore, Mr. A. R. Nichols, Mr. R. Patterson, Mr. G. Pim, Mr. R. Ll. Praeger, Mr. D. M'Ardle, Mr. G. H. Carpenter, and Mr. R. J. Ussher, to enable them to carry on their Researches into the Fauna and Flora of Ireland during the present year.

£20 to a Committee, consisting of Prof. Cunningham, F.R.S., Prof. E. P. Wright, M.D., Prof. Haddon, F.R.S., and Dr. C. R. Browne, to assist them in carrying on the work of the Anthropometrical Laboratory, and the Ethnographical Survey of Ireland.

The Treasurer laid on the table the Audited Accounts for 19012- and the Estimate for 1902-3.

On the motion of Prof. C. J. Joly, Secretary, seconded by Mr. R. S. Longworth-Dames, the following Address to the King on the occasion of his Coronation was adopted :—

“TO THE KING’S MOST EXCELLENT MAJESTY.

“MAY IT PLEASE YOUR MAJESTY,

“WE, the President and Members of the Royal Irish Academy, beg to offer to Your Majesty, and to Your Royal Consort, Queen Alexandra, our most loyal and hearty congratulations on the occasion of Your Coronation.

“Since our foundation, in 1786, by King George the Third, every reigning Sovereign of the Empire has been our Patron, and we wish to render to Your Majesty our most dutiful thanks for having been most graciously pleased to assume that position.

“Founded for the promotion of the study of Science, Polite Literature, and Antiquities, we trust that the work which the Royal Irish Academy has published has contributed in some degree to that end; and that its efforts in those fields have been recognized as not unworthy of the objects for which Your Royal Predecessor granted the Academy its Charter.

“We beg to tender to Your Majesty the assurance of our loyal devotion, and we trust that you may be long spared to occupy the Throne of this Empire.”

The President notified to the Academy that he had received an invitation to be present at the Solemnity of the Coronation.

Read the following Letter :—

SENATUS ACADEMICUS

UNIVERSITATIS REGIAE FRIDERICIANAE

L. B. S.

CENTUM abhinc annos et superioris seculi altero, in insula Finno, prope civitatem Stavangriensem in occidentali parte Norvegiae sita, natus est Nicolaus Henricus Abel qui, quamvis praematura morte in ipso iuventutis flore abreptus, tot tantaque sagacissimi ingenii edidit documenta, ut per totum orbem nomen eius inclaruisset et inter mathematicae artis sidera immortalem obtineat gloriam.

Quae quum ita sint, universitati nostrae visum est alumni facile celeberrimi memoriam festo per biduum d: v-vii Sept. agendo solenniter recolere.

Sperare fortasse licet, fore, ut tali occasione non populares tantum adsint nostri, sed ut etiam externarum universitatum doctarumque societatum legati, mathematicae artis potissimum, toti mundo communis, cultores urbem nostram visere non dedignentur.

Igitur doctissimum amplissimumque collegium vestrum gratum nobis fecerit, si unum e vobis ad nos miseritis, quem urbs nostra laeta salutet. Si nobis hoc petentibus benigni adsentiat, precari nobis liceat, ut nos quam primum de nomine titulisque legati vestri, a nobis digno honore excipiendi, faciat certiores.

Dabamus Christianiae Kal. April. MCMII.

W. C. BROGGER,

Rector Universitatis, Dec. fac. math.-phys.

S. MICHELET,

Dec. fac. theol.

FREDRIK STANG,

Dec. fac. iur.

E. POULSSON,

Dec. fac. med.

YNGVAR NIELSEN,

Dec. fac. hist.-philos.

CHR. AUG. ORLAND,

Secretarius Universitatis.

Professor Charles J. Joly, Secretary, was elected as delegate on the part of the Academy.

[ACADEMIA REGALIS HIBERNICA

SENATUI ACADEMICO VNIVERSITATIS REGIAE FRIDERICIANAE

S. P. D.

VESTRAM epistulam honorificam, Viri Doctissimi, qua nos in partem vocastis feriarum solemnium quas in mensem Septembrem Christianiae indixistis, libentes gratisque animis accepimus. Quomodo enim fama Nicolai Henrici Abel, adolescentis subtilissimi ingenii doctrinaeque summae, velut arbor occulto aevo in immensum creverit quis nescit? adeo ut nunc inter summa artis mathematicae decora summo robore constabilita longe lateque per orbem sese extendat. Itaque merito vobis cum in societatem memoriae tanti viri recolendae nos benigne invitastis gratias agimus maximas, et delegamus ex coetu nostro virum in arte mathematica excellentem, Carolum Jasper Joly, Astronomum Regalem in Hibernia, qui feriis vestris intersit et vobiscum omnia adolescenti illi egregio et funeris umbris summa reverentia et pietate verbis nostris exsolvat.

ROBERT ATKINSON, *Presses Academias.*

LOUIS C. PURSER, *Ab Actis Concilii Academias.*

D. DUBLINI

IN MENSE IUNIO

MCMII.]

Read the following letter :—

ACADEMIAE REGIAE HIBERNICAE.

COLLEGIUM OWENSE APUD MANCUNIENSES.

S. P. D.

QUAM arto coniuncti sint vinculo, viri doctissimi, quot se ad ingenuas artes excolendas studiose dederint, praeclaro fuit documento magna illa frequentia legatorum ex omnibus fere orbis terrarum partibus convenientium ut nobis decem iam lustris feliciter peractis summa benevolentia gratularentur, et fausta omnia optarent. Inter quos quod talem virum tam benigno in nos praeditum animo misit Academia vestra non parvo duximus esse honori. Et si quibus sive spatiis iniquis sive temporis inopportunitate exclusis concilio nostro ipsis

interesse non licebat horum tamen non defuerunt verba amplissima faventium laudantium optima precantium. Quare tanto tam illustrium fautorum consensu atque studio recreati, cum magno gaudio ipsi commoti sumus tum ad opus liberale novis iam aedificiis aucti et facultatibus largius suppeditantibus strenue incumbemus ut et doctrinae quasi lampada eis qui nos excepturi sunt rite tradamus et scientiae terminos novis usque repertis propagemus. Quod si nobis satis successerit quae est hominum doctiorum societas vos quoque gavisuros pro certo habemus. Valet.

DEVONSHIRE, *Præses*.

JOSEPH THOMPSON, *Thesaurarius*.

ALFRED HOPKINSON, *Praepositus*.

Donations were announced, and thanks voted to the Donors.

MONDAY, JUNE 23, 1902.

PROFESSOR ROBERT ATKINSON, LL.D., LITT.D., in the Chair.

Rev. William Morgan Tate-Stoate, M.A., and Professor Wilbraham FitzJohn Trench, M.A., signed the Roll and were admitted Members of the Academy.

In the absence of Mr. A. R. Nichols, B.A., Dr. R. F. Scharff read "A List of the Echinoderms of Ireland" (being a Report from the Royal Irish Academy Fauna and Flora Committee).

Mr. C. Litton Falkiner, M.A., read a Paper on "The Ouzel Galley Society, 1705-1889, in connexion with a Gold Medal recently acquired by the Academy."

Mr. Thomas J. Westropp, M.A., read a Paper on "The Dolmens of Eastern Clare (Tulla Baronies)."

Rev. Bartholomew MacCarthy, D.D., read "Notes on the Irish Paschal System."

Professor D. J. Cunningham, F.R.S., communicated a Paper by Mr. Gordon M. Holmes, M.B., on "The Comparative Anatomy of the *Nervus Acusticus*."

Various objects of Gold, Bronze, and Stone recently acquired for the Academy's Museum were exhibited by Mr. G. Coffey.



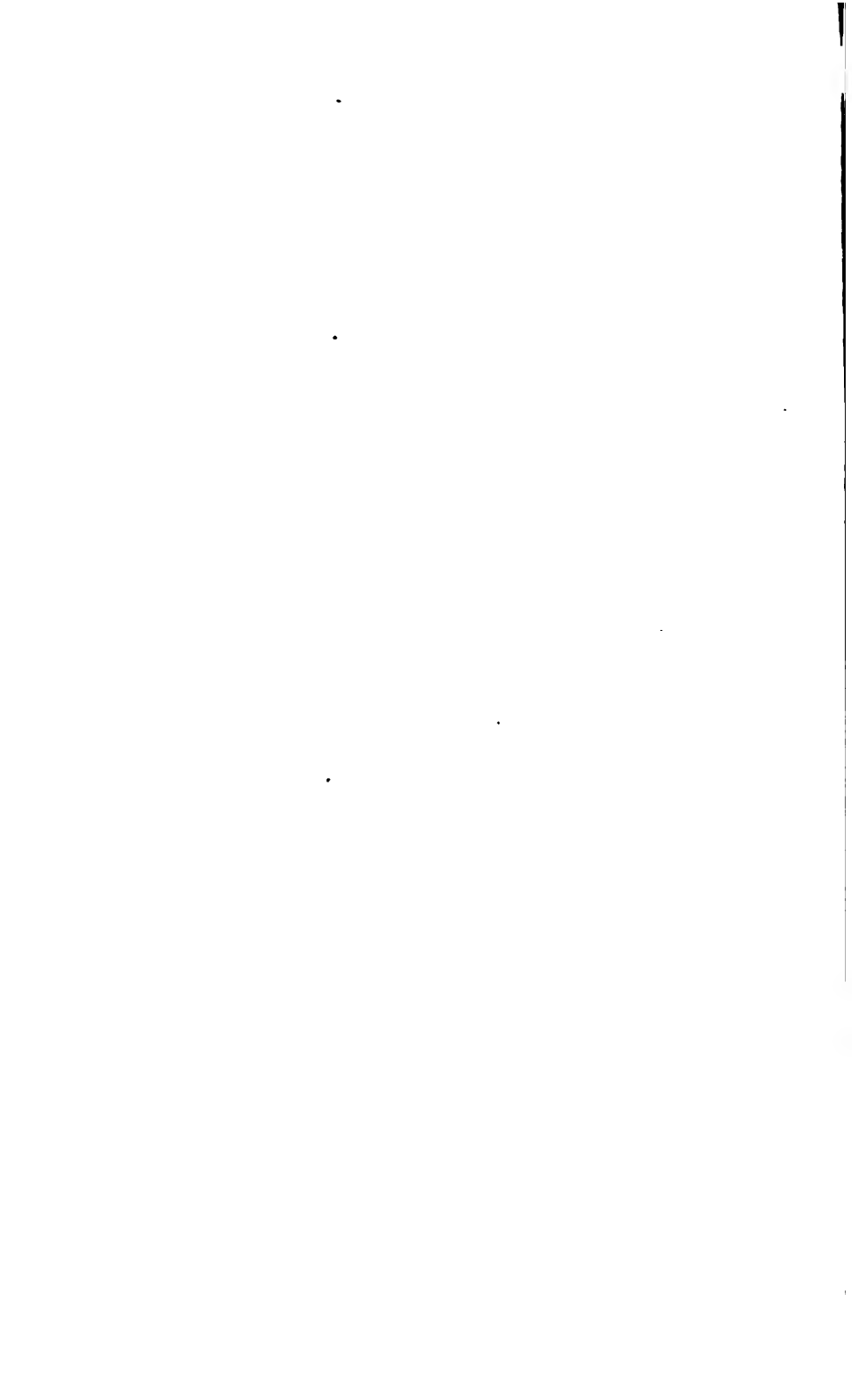
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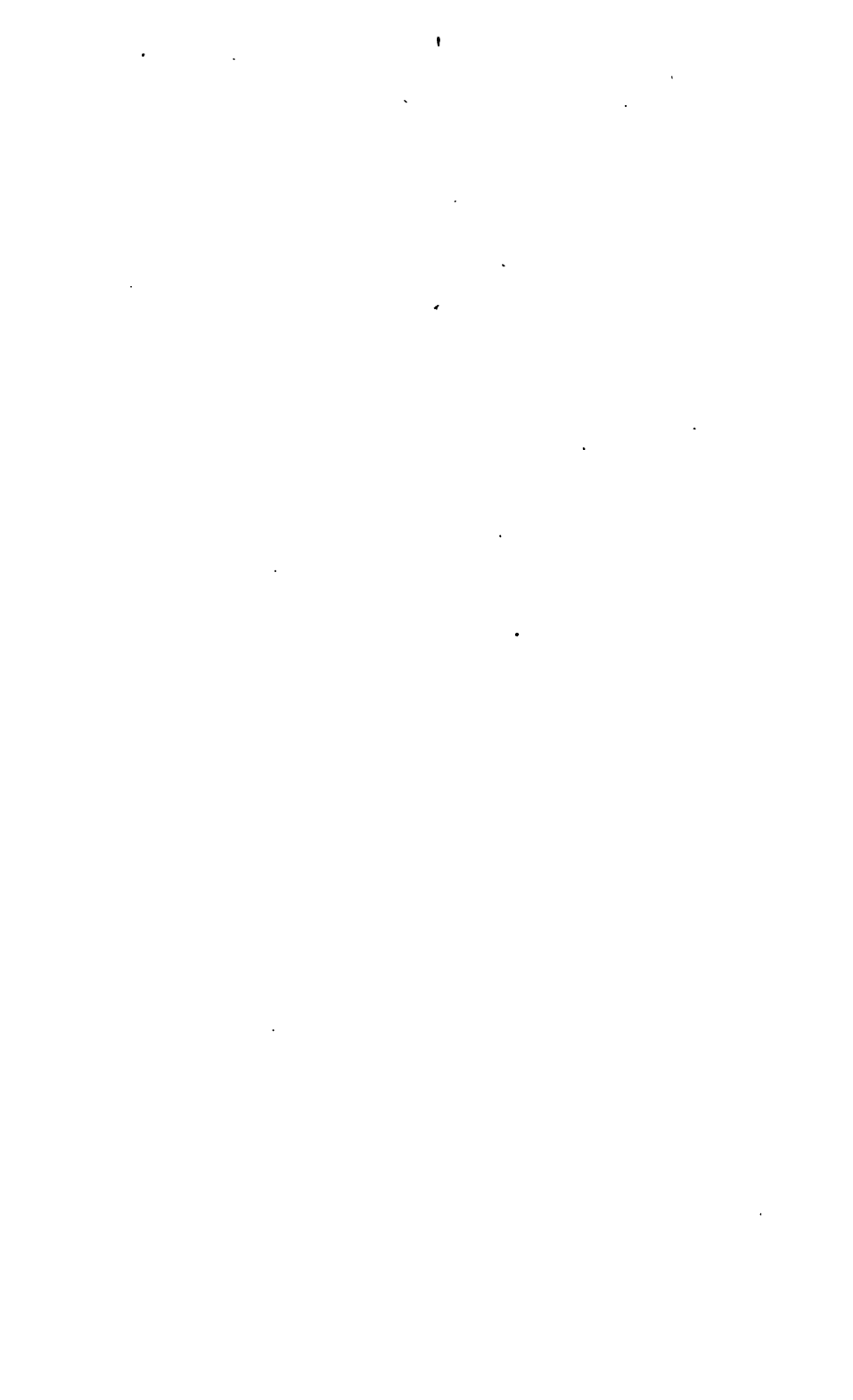
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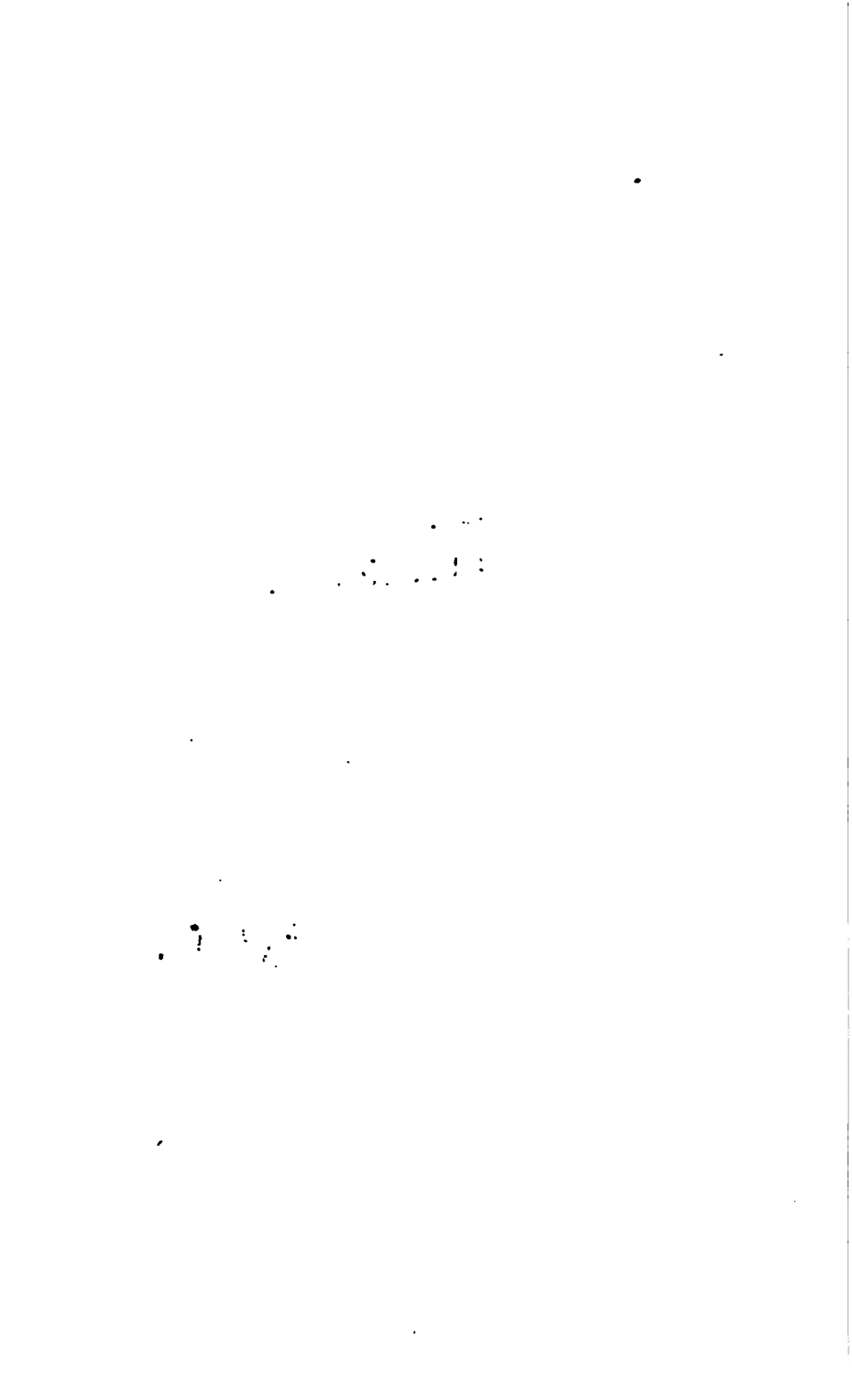
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Minutes of the Meetings of the Academy, from April 9, 1900, to
June 28, 1902. f 342—432 .









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